



CENTRAL PROVINCES.

FAMINE RELIEF WORKS.

APPENDICES (I to XXV-*a*) to the General Order No. 287—7630-F.,
dated the 20th September 1899.

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APPENDIX I.

WAGES READY-RECKONER.

Table showing the wages to be paid to the various classes of persons on Famine Relief Works (paragraphs 52 to 55) being the money equivalents payable on the basis of the current retail price of the staple grain in ordinary local consumption by the labouring classes, and in the state, husked or unhusked, in which that grain is ordinarily sold by retail for consumption (paragraph 52.)

Description of persons in receipt of relief.	Basis of the wage.	RETAIL PRICE OF THE ORDINARY GRAIN AS ABOVE.														THE WAGES TO BE PAID—										
		16 seers per rupee.	15½ seers per rupee.	15 seers per rupee.	14½ seers per rupee.	14 seers per rupee.	13½ seers per rupee.	13 seers per rupee.	12½ seers per rupee.	12 seers per rupee.	11½ seers per rupee.	11 seers per rupee.	10½ seers per rupee.	10 seers per rupee.	9½ seers per rupee.	9 seers per rupee.	8½ seers per rupee.	8 seers per rupee.	7½ seers per rupee.	7 seers per rupee.	6½ seers per rupee.	6 seers per rupee.	5½ seers per rupee.	5 seers per rupee.		
WORKERS. <i>Special.</i> —(a) Men with special qualifications such as quarrymen, &c. (b) Mates of gangs and other persons in responsible posts. Class I.—Diggers Do. II.—Carriers (over 14 years.) Do. III.—Working children (8 to 14 years.) Adult dependant over 14 years and minimum wage. DEPENDANTS. Class IV.—Adults (over 14 years.) 8 "																										

NOTE.—(1) The rate of 13½ seers makes the Carrier and the Minimum wage identical. When, therefore, grain is selling at this rate, either 13 or 14 seers should be prescribed as the basis, according to circumstances.
 (2) Cash doles to non-working children should very rarely be given, as all those incapable of work should be fed at kitchens. When the mother of an infant-in-arm is being fed in a kitchen, a child's cooked ration in addition to her own will be given her in lieu of the one pice.
 * If not fed in kitchen.

APPENDIX II.

Notes on the Formation of a Famine Relief Camp.

The following list, although not absolutely exhaustive, contains all the essential articles found by past experience as necessary to start a Famine Relief Camp, and the accompanying notes may be found useful as a guide to other matters connected with the works:—

1. The camp should be laid out in advance, and as a sample of the requirements the arrangement shown on the accompanying plan may be followed in a general way.
 Site and Head-quarters Camp.
2. A sufficiency of tools must be sent out in advance; these should be kept in a separate enclosure and methodically arranged; every effort should be made to keep an accurate record of the receipts and issues.
 Tools.
3. Wells must be started in advance and fenced in; each well will be under a guard who will be the only persons allowed to draw water; suitable arrangements must be made for drawing the water, and there should be a good ramp with an outward slope all-round for drainage.
 Wells.
4. There must be a good store of grain on the works, and an agreement should, before the work is started, be drawn up with a reliable Bunya for this requirement in consultation with the Deputy Commissioner.
 Grain supply.
5. Arrangements with the Deputy Commissioner for the supply of small coin and copper must be made in advance. Police guards during transit of coin will be necessary. A small Police guard will also be found necessary at each camp.
 Coin for payment.
 Police Guard.
6. When all the articles mentioned in the list are at site, and when all the above-mentioned arrangements are made, and the staff duly appointed, intimation should then be formally given to the Deputy Commissioner that the camp is ready for the admission of relief workers.
 Intimation to Deputy Commissioner on completion of arrangements.
7. After admission, the workers should be employed in making their chuppers, the lines for which should be previously selected. Where no jungle exists, arrangements must be made beforehand and a supply of grass or mat huts provided in advance. These must be arranged in regular streets on a selected site, and are on no account to be dotted about irregularly all over the works.
 Hutting.
8. If the camp is a metal-breaking one, arrangements must be made beforehand, either at the quarry or at the roadside, the latter if possible, for the supply of at least 20,000 cubic feet of rubble, not more than $\frac{1}{2}$ cubic foot in size, ready for the relief workers to break, and a continuous supply to meet the requirements must thereafter be forthcoming. Ordinary Public Works contractors may be employed for this purpose, as quarrying and blasting involves skilled labour and is not suitable for relief workers.
 Rubble for metal breaking.
9. If the camp is engaged on road construction, the Executive Engineer must have at least 5 miles of "Section," properly graded, ready for the workers, and must keep the section well ahead to avoid work coming to a standstill. A "survey" in detail of the line is not absolutely essential, but the road must be carefully aligned and sectioned.
10. When the gangs are formed, which will be one of the first duties of the Officer-in-charge after the admission of applicants, and they are ready to commence work, stone-breaking should be carried out in strict accordance with the detail instructions which will be separately issued.
11. If engaged on road construction, the gangs should be separated by a space of 400 feet, within which each will work until that portion is completed, but no excavation is to commence until the centre line and the pits have all been accurately nicked out.
12. Work will then proceed in accordance with instructions which will be separately issued.

13. All crowding on works must be carefully avoided, and the strictest discipline must be maintained, or everything will get into confusion.

14. The duties, in detail, of the Work Agent, the Gang Muharrirs, and Mates, including the method of measurement of work and mode of payment, will all be separately set forth in full detail for the guidance of Officers-in-charge.

15. These latter will also be supplied with sample forms, fully entered up, of all initial accounts they will be expected to submit, and full explanation of every item will be attached.

16. Sanitary arrangements must be most carefully attended to from the commencement. Guards should be posted, and made conspicuous by special badges, to see that people commit no nuisance within the area marked out by special flags. In a metal-breaking camp a specially selected ground well away from all wells should be marked out, and on road construction, where the workers may extend over several miles, flags may be posted 300 yards from line of road on either side.

Enclosures.

Plan.
List.

FAMINE RELIEF-WORKS.

Establishment

General Abstract of cost of Tools, Hutting and other Miscellaneous items required for the formation of a Camp of 6,000 workers.

Serial No.	Sub-heads.	Amount.	Total.
	I.—TOOLS AND PLANT.	Rs.	Rs.
1	General	2,381	
2	Kitchen and Hospital	686	
3	Standing camp for Sub-Divisional Officer and Famine Works Superintendent.	367	3,434
	II.—HUTTING AND OTHER ITEMS.		
1	Hutting	1,838	
2	Miscellaneous	728	2,566
	GRAND TOTAL ...		6,000 or Re. 1 per worker.

Note.—The cost of tools for metal-breaking and construction, &c., would vary according to local requirements. Allowing approximately Rs. 1,000 for these tools for every 2,000 workers in accordance with Appendix II to the General Order, the additional cost for a camp of 6,000 workers would be Rs. 3,000, thus bringing up the total cost of formation of camp to Rs. 9,000 or Re. 1-8-0 per worker.

I.—Tools and Plant.

List of articles required for a Famine Relief-camp of 6,000 workers.

No.	Description.	Cost.	Remarks.
(1) GENERAL.		Rs.	
1	Iron cash chest with duplicate keys at Rs. 50 each ...	50	
2	Teakwood boxes, tin lined, for copper, with double hasp, 3" brass, at Rs. 24 each.	48	
75	Iron water barrels, 2' diameter × 3', 50 gallons, with brass tap, for carriage and storage of water, at Rs. 24 each.	1,800	
20	Camp tables at Rs. 7 each ...	140	
20	Chairs at Rs. 4-8-0 each ...	90	
20	Stools at Rs. 2 each ...	40	
75	Tin badges and belts for Mates at Re. 1 each ...	75	
24	Hurricane lanterns at Rs. 3-8-0 each ...	84	
12	Street lamps with poles at Rs. 4 each ...	48	
1	Small cheap clock ...	6	
Total ...		2,381	
(2) TOOLS FOR KITCHEN AND HOSPITAL			
(a) Kitchen.			
6	Large copper or brass degchies for boiling rice and dal at Rs. 12 each.	72	
9	Small copper or brass degchies for boiling rice and dal at Rs. 6 each.	54	
600	Tin plates (Sunkies), at 3 pies each ...	10	
600	Tin mugs or gurgahs at 3 pies each ...	10	
60	Gurrhas, at Re. 0-1-0 each ...	4	
9	Strong wooden boxes, large, for keeping rice, dal, &c., with good locks, at Rs. 6 each.	54	
Total ...		204	

No.	Description.	Cost.	Remarks.
(2) TOOLS FOR KITCHEN AND HOSPITAL.—(Concl'd.)		Rs.	
(b) Hospital.			
3	Large copper degchies at Rs. 12 each ...	36	
6	Small do. at Rs. 6 each ...	36	
30	Country cots at Re. 1 each ...	30	
30	Do. blankets at Rs. 2 each ...	60	
2	Rough almirahs made of packing cases for keeping medicines, at Rs. 10 each.	20	
1 set	Hospital medicines and surgical instruments, &c. ...	300	
10	Glazed earthenware (P. 1 fan) at 10/8 per piece each	5	
	Total ...	482	
	Total (a) and (b) ...	686	
(3) STANDING CAMP FOR SUB-DIVISIONAL OFFICER AND FAMINE WORKS SUPERINTENDENT.			
1	Hill tent, 10' x 10', with bath-room ...	300	
1	Wash-hand basin and stand ...	5	
1	Camp bed ...	18	
1	Do. commode ...	5	
1	Galvanized iron bath tub ...	7	
2	Camp tables ...	16	
2	Chairs ...	6	
1	Easy chair ...	10	
	Total ...	367	

II.—Hutting and other Miscellaneous Items.

List of requirements for a Camp of 6,000 workers.

No.	Description.	Cost.	Remarks.
	(1) HUTTING.	Rs	
1	Constructing Camp for Office, Hospital, Staff-quarters, &c., as per details attached.	1,338	
25	Moveable sheds for Piaos at Rs. 10 each ...	250	
1	Materials for coolies' huts for Camp of 6,000 workers, say ...	250	
	Total ...	1,838	
	(2) MISCELLANEOUS ITEMS.		
240	Empty Kerosine oil tins at Re. 0-3-0 each ...	45	
150	Yards coir rope ...	18	
75	Balls good twine at Re. 0-4-0 ...	19	
36	Doles (Buckets) for drawing water, at Re. 1 each ...	36	
75	Tin-pots at Re. 0-2-0 ...	10	
60	Spouts for Piaos at Re. 0-4-0 each ..	15	
75	Gurrahs at Re. 0-1-0 each ...	5	
600	Bamboos for flags, &c., at Rs. 5 per hundred ...	30	
30	Maunds white lime at Re. 1 per maund ...	30	
150	Cotton nets bags for coins as made in Nagpur Central Jail, at Re. 0-8-0 each.	75	
40	Mounting water barrels on light carts at Rs. 10 each ...	400	
	Sundries ...	45	
	Total ...	728	

Details of Hutting for 6,000 workers.

(Vide Type Plan.)

Description.	MEASUREMENTS.			Contents.	Rate.	Amount.	Total.
	Number.	Length.	Breadth.				
<i>Office and Staff-quarters.</i>				S.ft.			
Office, 16' x. 16', with 5 feet verandahs.	1	26	26	676			
Officer-in-charge's quarters ...	1	20	15	300			
3 Work Agents and 1 Clerk ...	4	10	8	320			
Sub-cashiers, Gang Muharrirs, Police Guards, 2 rows of 9 quarters each.	18	9	6	972			
Piao ...	1	9	6	54			
Tools Muharrir and Assistant ...	2	9	6	108			
		Total	...	2,430	0 3 0 per s.ft.	456	
Enclosures for Tools ...	1	190	6	S.ft. 1,140	1 8 0 %	17	
Fencing all round, r.ft. ...	1	930		930 r.ft.	6 0 0 % r.ft.	56	
<i>Hospital and Kitchen.</i>							
Dispensary ...	1	32	12	384			
Store ...	1	27	12	324			
Male and Female Wards ...	2	36	18	1,296			
Hospital Assistant ...	1	10	8	80			
Compounders ...	3	9	6	162			
Cook-house ...	1	12	12	144			
Cook-house ...	1	40	12	480			
Kitchen, 6 units, i. e. (12 rooms) ...	1	60	16	960			
Piaos ...	2	9	6	108			
		Total s.ft.		3,938	0 3 0 per s.ft.	738	
Enclosure and Fencing, r.ft. ..	1	1,189		1,189	6 % r.ft.	71	
				Total Rs.	..	1,338	

Establishment.

Names.			Cost.	Remarks.
One Officer-in-charge, at Rs. 100	...	...	Rs. 100	
One Work-Agent, at Rs. 40	...	...	40	
One Clerk, at Rs. 25	...	...	25	
Four Gang Muharrirs, at Rs. 15 each	...	...	60	
One Hospital Assistant, at Rs. 30	...	...	30	
One Kitchen Muharrir, at Rs. 15	...	...	15	
One Compounder, at Rs. 20	...	...	20	
Twelve Sweepers, at Rs. 6 each	...	...	72	
Two Mates (sharp) for setting out work, at Rs. 7 each		...	14	
One Tool Muharrir, at Rs. 20	...	...	20	
One Head and 3 Constables for charge of cash		...	40	
Total			436	

FAMINE RELIEF WORKS.

WATER-SUPPLY OF FAMINE RELIEF CAMPS.

DISTRIBUTION OF WATER.

GENERAL REMARKS.

There being at present great scarcity of water everywhere, strict precautions must be taken against waste and contamination. The arrangement proposed below entirely does away with the hand-to-hand distribution of water and the dipping of *lotas* in water vessels, and removes all chances of contamination likely to arise from the use of earthen vessels more or less imperfectly baked.

The iron drums 2'×3' (costing about Rs. 20 each) proposed to be substituted for earthen nands will last throughout the famine operations and will on their termination find a ready sale in the market (for the storage of grain, oil, water, &c.). Similar drums placed on light carts can be used for the carriage of water. They will hold 60 gallons and cost about Rs. 35 each including carts. Relief-workers will ordinarily be employed for drawing the water-carts. Sketches are herewith attached showing—

- (1) Method of filling at well.
- (2) „ „ of delivery at camp and at road-side piaos.
- (3) Details of a portable piao.

The accessories required and the method to be adopted are described below.

I.—FILLING AT WELL.

Before drawing water, the waterman washes his hands with the permanganate solution kept on a stool for the purpose. Water is then drawn out of the well in *doles*, as usual, and poured into the funnel pipe which delivers into the water-carts. At night, or whenever required by the Hospital Assistant acting under the orders of the Civil Surgeon, all the *doles* with their ropes must be kept soaked in the permanganate solution contained in the iron vessel specially provided for the purpose.

Accessories required and approximate cost.

			Rs.	a.	p.
4 iron doles at Rs. 1-2-0 each	...	...	4	8	0
4 ropes for doles at Re. 1 each	...	...	4	0	0
4 tin funnel pipes at 12 annas each	...	...	3	0	0
1 iron drum with $\frac{1}{4}$ " tap for permanganate solution for washing hands.			1	8	0
1 iron vessel for disinfection of doles and ropes at night.			3	0	0
2 rough stools for drum and vessel at 8 annas each	...		1	0	0
Total cost	...		17	0	0

II.—CARRIAGE TO CAMP AND ROAD-SIDE PIAOS.

This will be effected by means of water-carts. For short leads, the smaller ones (2'×3', 60 gallons) are to be used, drawn by coolies, of whom 2 to 4 will be required per cart according to the lead and the strength of the coolies. For very long leads, the larger galvanized iron barrels (2'×5', 100 gallons) may, when absolutely necessary, be used, drawn by bullocks.

Accessories and approximate cost.

Iron barrel, 2' diameter 3' long with cover and 1" tap, Rs. 20 each.
Iron barrel mounted on light carts or rengis, Rs. 35 each.

III.—DELIVERY AT CAMP AND AT ROAD-SIDE PIAOS.

For the free delivery of water from the water-carts into the barrels of the pias by means of funnel pipe, it is necessary that the carts should be led up to a sufficiently high level beside the pias. For the fixed pias at camps, which will be on comparatively level ground, a natural elevation will not generally be available and a ramp must be thrown up, costing say Rs. 4 to Rs. 5 each. But for the movable road-side pias, such an expenditure would not be justifiable, and the necessary height must be secured by taking advantage of side-long ground, nallah banks and sides of road-cuttings and embankments or any other elevation ready to hand. On existing roads borrow pits will serve admirably for the pias, and on new roads a borrow pit may be excavated to the desired depth wherever necessary and the earth utilized for road embankment. Failing these expedients, metal and moorum stacks may be made to serve the purpose, and the cost of making an earthen ramp avoided.

IV.—DESCRIPTION OF A PORTABLE PIAO.

The piao will consist of an iron barrel 2' diameter* 3' long, with 1" brass tap placed on a rough wooden trestle and kept cool by being covered with straw and watered. There will be a rough stool for the waterman, who has only to open the tap, to allow water to flow freely through the narrow trough set up on stakes as laid down in paragraph 102 of G. O. No. 287-7630, dated the 20th September 1899. There will be a stiff wire brush for scrubbing the inside of the barrels from time to time.

V-shaped tin drains will be laid for carrying away all spillage and preventing the formation of slush in the immediate vicinity of the pias. The pias fitted up as above will be enclosed within a 6' x 6' shed, the whole being so designed as to be easily removable from place to place. There will be a bottle of permanganate solution on a rude shelf at one corner of the shed for the disinfection of the barrels, whenever required by the Hospital Assistant acting under the orders of the Civil Surgeon.

Accessories and approximate cost.

	Rs.	a.	p.
1 removable shed (6' x 6') at 3 annas per square foot	...	7	0 0
1 iron barrel (2' x 3') with cover 1" tap covered with straw at Rs. 20 each	...	20	0 0
2 rough trestle for the above	...	1	12 0
2 stiff wire brush	...	1	0 0
1 funnel pipe	...	0	12 0
1 iron trough with stand	...	0	4 0
1 rough stool	...	0	8 0
14 running feet tin drains at 1 anna per running foot	...	0	14 0
(a) Total cost of a movable piao, say	...	32	0 0
Add for ramp in the case of a <i>fixed</i> piao	...	5	0 0
(b) Total cost of a fixed piao at camp	...	37	0 0

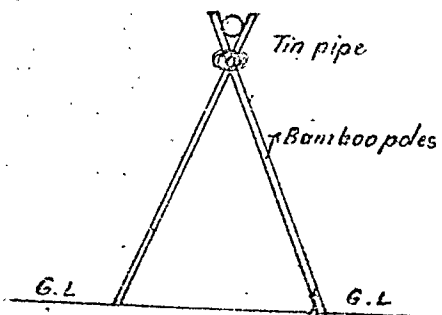
* N. B.—All barrels will be horizontal so that they may be used for pias or for carting water.

R. MITRA, A. M. I. C. E.,

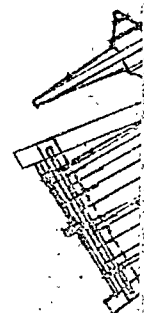
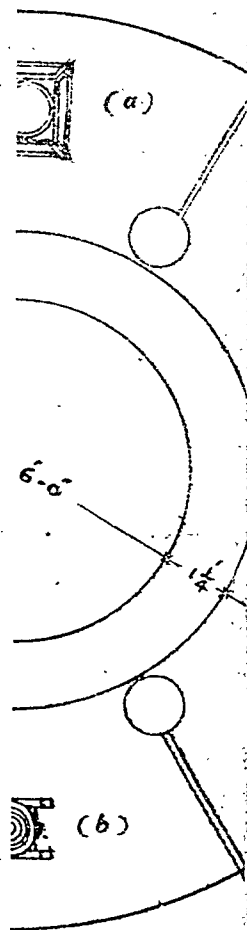
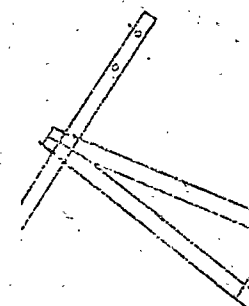
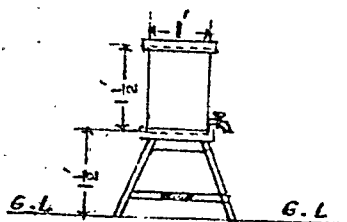
HOSHANGABAD: }
The 12th December 1899. }

Executive Engineer,
Hoshangabad Division.

ELEVATION OF STAND
TO SUPPORT TIN PIPE



ELEVATION AT (a)



(Sd.) R. Mitra A.M.I.C.E

Executive Engineer

Hoshangabad Division

Dated 1.10.00

WATER SUPPLY FOR FAMINE RELIEF CAMPS PLAN SHOWING ARRANGEMENT AT WELLS

Scale 3' Feet = 1 Inch

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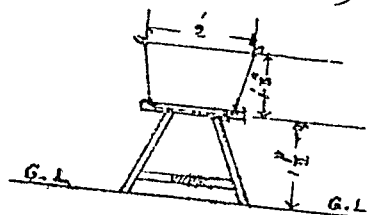
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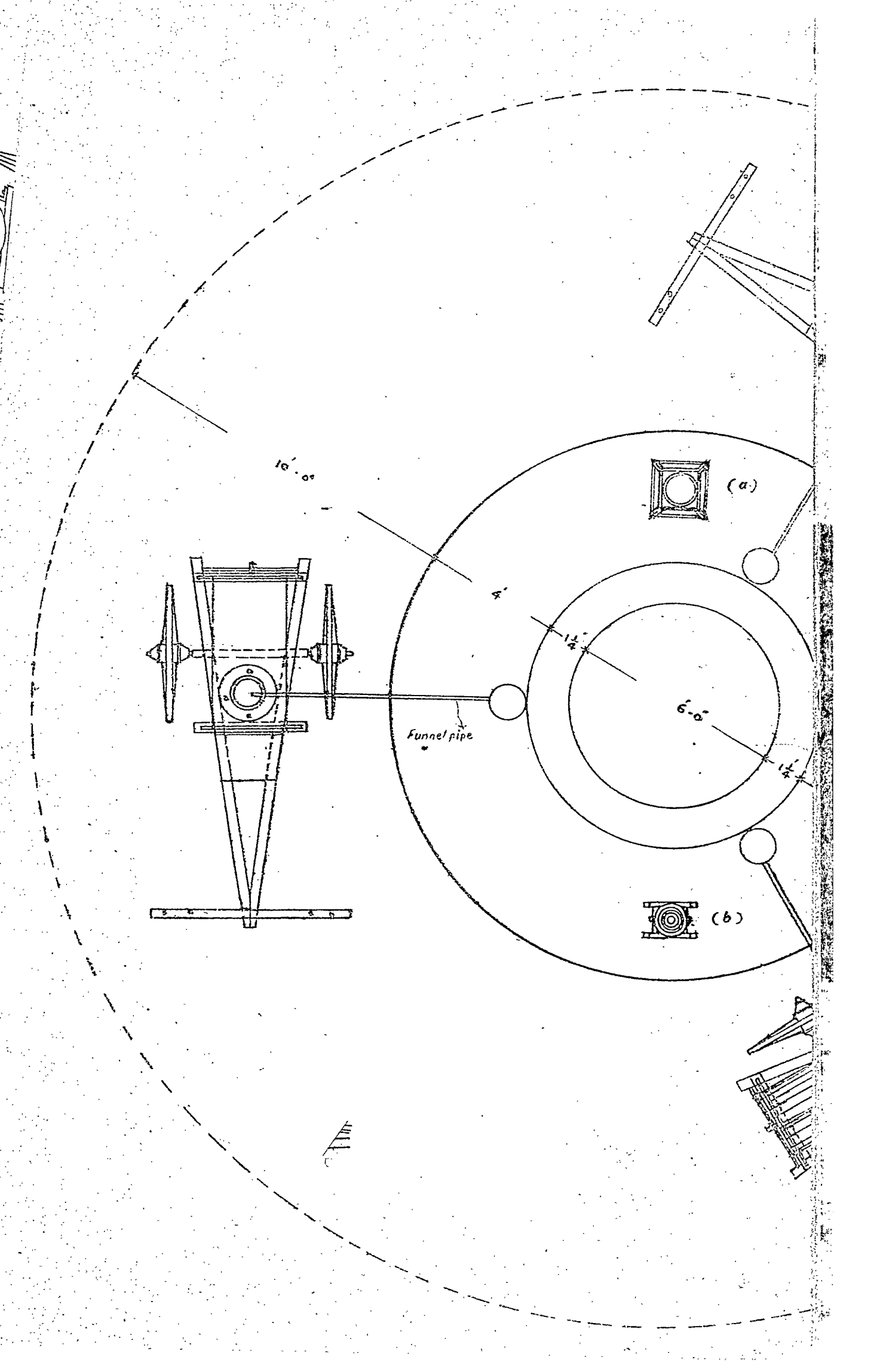
- (a) A Stool for holding a small drum filled with $\frac{1}{2}$ " top contain-
-ing permanganate solution for
-washing hands before drawing
water
- (b) A Stool for holding an iron
vessel (gongal) for keeping
rope & bucket soaked in
permanganate solution over
night

N.B.

- (1) Carts with 5'x2' dia barrels will
be drawn by bullocks and those
with 3'x2' dia barrels by 3
coolies (2 in front & 1 in rear)
- (2) Coolies can only get water
at piaos

ELEVATION AT (6)



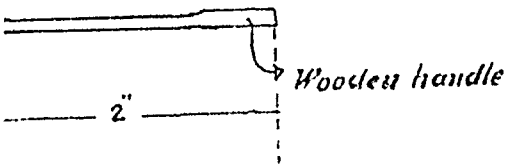


E RELIEF CAMPS

ED FOR PIAO

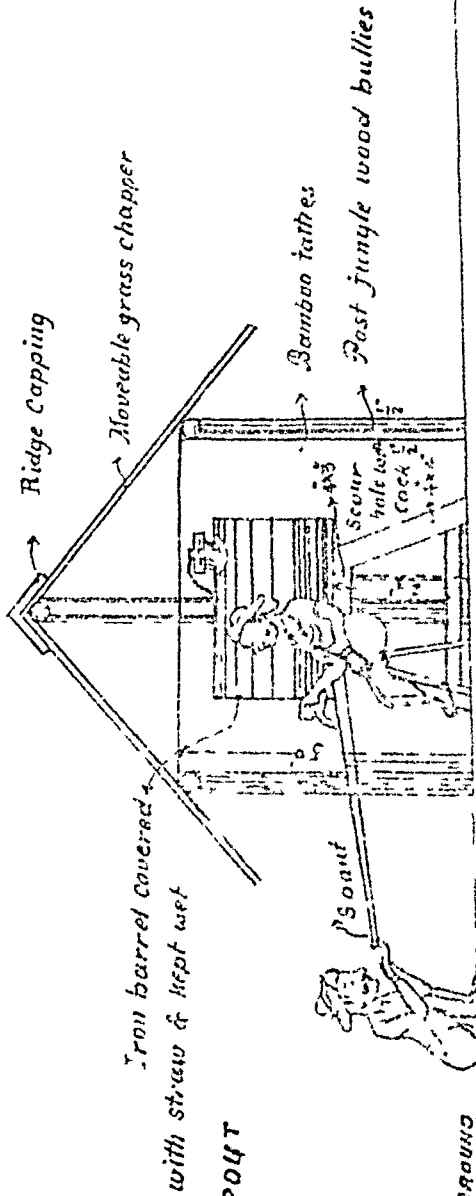
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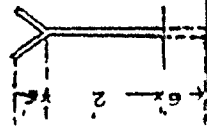


1 will suffice at each piao

SECTION ON A.B



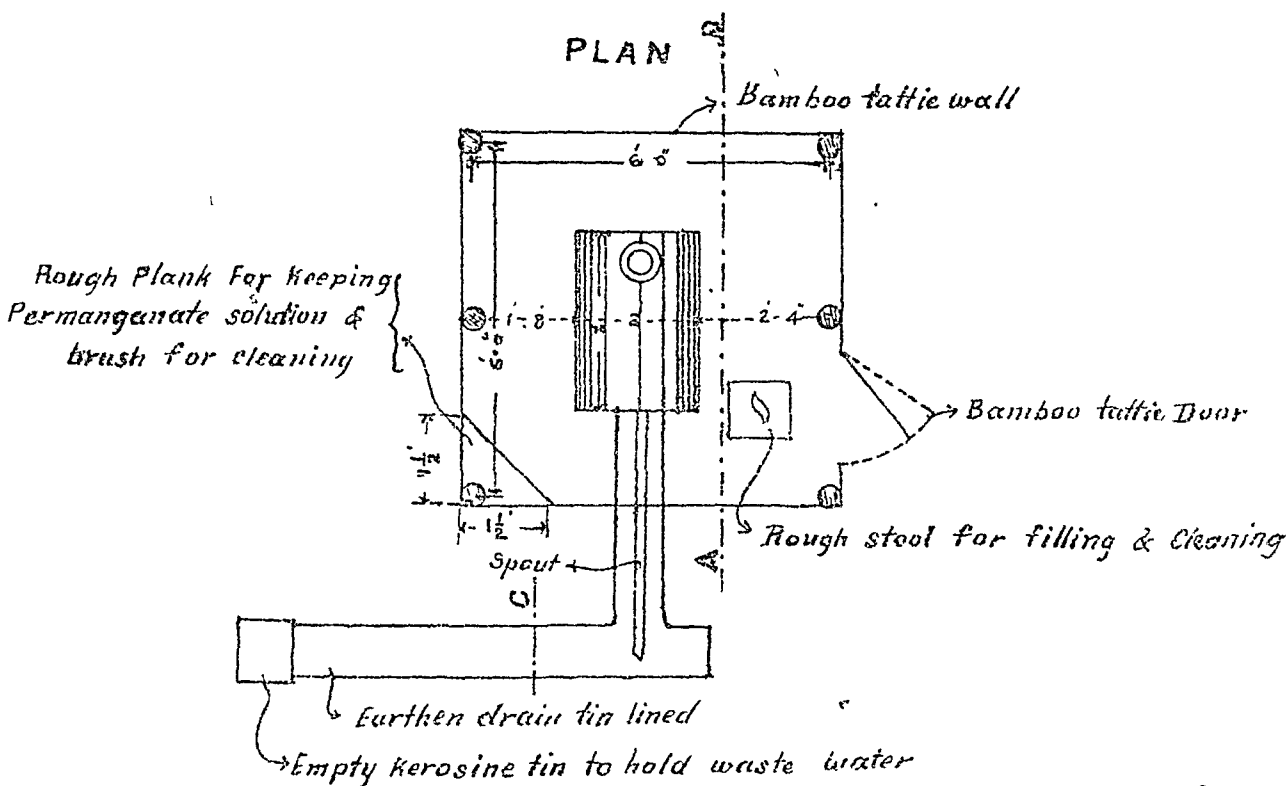
ELEVATION OF STAND FOR SPOUT



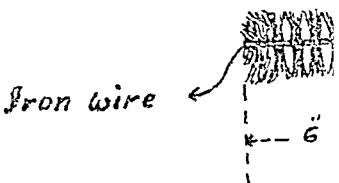
WATER SUPPLY FOR

PLAN OF A MOVEABLE

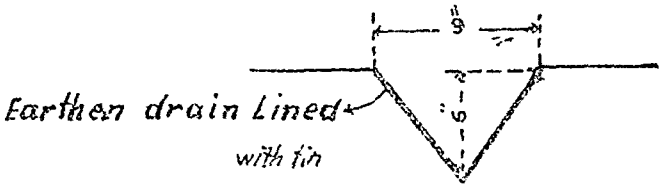
Scale $\frac{1}{3}$



ENLARGED



ENLARGED SECTION ON C



N.B. Ordinarily

FAMINE RELIEF WORKS.

WATER SUPPLY.

Utilization of surface water for drinking purposes.

This will be practicable where (i) in the case of streams which have ceased to flow a considerable body of water is held back by a rocky out-crop in the nallah bed or where (ii) in the case of streams which are still running, the flow can be arrested by a series of temporary bunds. The water should be filtered through sand, moorūm or any other porous stuff ready to hand before use. In order to effect this (a) a bund of sand or moorum should be thrown right across the pool at its deepest part, if it is not very wide; or at one or more points along the banks in the form of groynes, if very wide; and (b) one or two wells or trenches excavated in the body of the dam, for drawing water. Where stone is abundant, it will be economical to build the steining of rough dry stone masonry. But where the pool is deep and stone scarce, corrugated iron culvert pipes (18 B. W. G. 3' diameter, costing Rs. 5 per rft.), may very conveniently be used for the purpose, the pipes being perforated at the bottom for facility of in-flow. If two such wells are provided at one place, taking 6' as the length of each, the cost comes to Rs. 60, which is inconsiderable. The culvert pipes can moreover be removed and utilized elsewhere when the camp is closed or removed to another place. For the first week or so water should not be used out of these wells for drinking purposes; but they should be constantly drawn on, and the water baled out and thrown back into the nallah if it cannot otherwise be utilized. This will induce a flow through the filter bund of sand or moorum which will thereby be washed clean and a scum will ultimately be formed on the waterfaces of the bund. This scum will help in effecting a thorough purification, and once it is properly formed and the process of horizontal filtration regularly sets in, the well may be safely used for drinking purposes.

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CIRCULAR LETTER N^o. $\frac{8}{1996}$ (F-5).

CENTRAL PROVINCES, PUBLIC WORKS DEPARTMENT.

[S e c r e t a r i t.]

FROM

G. J. PERRAM, Esq., M. INST. C. E.,

SECRETARY TO THE CHIEF COMMISSIONER,

Central Provinces,

Public Works Department,

TO

ALL EXECUTIVE ENGINEERS OF DIVISIONS,

Central Provinces.

Nagpur, the 21st February 1900.

SIR,

I am directed to inform you that the Officiating Chief Commissioner has considered the question of the employment of bullocks for the water-carts used on famine relief works, and directs that water-carts should be drawn by famine relief workers, the use of bullocks to draw the water-carts, where now employed, being discontinued.

2. The famine relief-workers, employed on drawing the carts, will be Classes I and II, they will receive the ordinary wages, only where they have done a full day's work. The number of workers to draw a cart, and the number of trips a water-cart should make, will be decided by the Executive Engineer after careful enquiry.

3. In many places, when the lead is over one furlong, it will be more economical to carry moorum or metal, from quarry to road-side, in carts drawn by famine relief-workers, Classes I and II, rather than to carry the materials by head-loads, this mode of carriage should be now tried on the works in the Central Provinces; it has been tried and found useful on works in the Bombay Presidency. In all cases the labour must be strictly tasked every day; the number of persons of each class to draw a cart, the quantity to be carried in it, and the number of trips being laid down.

4. Mr. Fraser wishes all works, with as few exceptions as possible, to be done by famine relief labour; contract work for quarrying, or other work shall not be allowed, and if any quarrying is now done by contractors, this should be stopped, and the work done by famine relief labour, as soon as arrangements can be made to this effect.

5. It is not alone necessary, that all work shall be carried out by famine relief gangs, but also, that daily, each gang shall be strictly tasked.

I have the honour to be,

Sir,

Your most obedient Servant,

G. J. PERRAM,

Secretary.

CIRCULAR LETTER N^o. F-11.

CENTRAL PROVINCES, PUBLIC WORKS DEPARTMENT.

[Secretariat.]

FROM

G. J. PERRAM, Esq., M. INST. C. E.,

SECRETARY TO THE CHIEF COMMISSIONER,

Central Provinces,

Public Works Department,

TO

ALL EXECUTIVE ENGINEERS OF DIVISIONS,

Central Provinces.

Nagpur, the 7th April 1900.

Carriage of water by famine coolies.

SIR,

I am directed to call your attention to the orders contained in this office Circular letter No. 8—1996, dated the 21st February last, regarding the discontinuance of the use of bullocks to draw the water-carts on relief-works and the employment of famine relief-workers for that purpose.

2. On moorumed and metalled roads, and even on fair-weather roads where the gradients are not severe, no difficulty should be experienced in employing relief-workers on water-carriage. It is necessary that there should be proper approaches to the sources of water-supply; and where they do not exist, approaches can be made by famine labour. They will permanently benefit the roads.

3. If the large iron barrels of 100 gallons capacity are found too heavy to be dragged by coolies, smaller barrels, say 2' diameter \times 3' holding about 50 gallons can be cheaply made and mounted on light carts or *rengis*. Where such iron barrels cannot be procured, wooden casks of 40 to 50 gallons capacity can be used for the purpose.

4. Should none of the above expedients be easily adopted, water can be carried by relief-workers on *kawars* or *banghis*, each man carrying two kerosine tins or iron drums of 3 to 4 gallons capacity. Only in special cases should the expense of engaging bullock-carts on hire be incurred.

5. Complaints have reached the Officiating Chief Commissioner that this form of labour is distasteful to the workers who are said to consider it a degradation to be treated in this manner like cattle. It is a common occurrence in a large town to see water and grain carts dragged by coolies. Mr. Fraser is not prepared to accept as a general principle that the dragging of carts is either unsuited or derogatory to human labourers.

6. In this connection I am also to draw your special attention to the necessity of taking strict precautions to preserve the purity of water in the course of distribution. Every effort should be made to minimise the chances of contamination by effecting the distribution by as few persons as possible, and by avoiding hand-to-hand distribution as far as circumstances will allow. All water should, as far as practicable, be stored and conveyed in iron vessels fitted with covers and taps for drawing. All sources of supply, vessels for carriage and storage, and persons connected with the distribution should be freely disinfected in accordance with such instructions as the Chief Medical Officer of the district may lay down. These precautions are of vital importance to the health of the bodies of people collected together at the relief camps and of the district at large.

I have the honour to be,

Sir,

Your most obedient Servant,

G. J. PERRAM,

Secretary.

APPENDIX III.

FAMINE RELIEF-WORKS.

SPECIAL GANGS.

The following distribution for a camp of 4,000 is the result of past experience, and will be found useful as a guide:—

I.—Water-supply.

Establishment for Piaos.	For each two gangs one "piao" is sufficient with	22 men.
	one man and one woman at each ... Total	22 women.
	Six water-barrel carts will be required if the camp is one of road construction, and one man will be required for each	6 men.
	There would probably be about six temporary wells in the nalla bed to be guarded	6 "
	For one "Piao" at head-quarters camp	2 "
	For four "Piaos" at worker's lines	8 "
	Total	66
Establishment for Kitchens and Hospital.	For the <i>Kitchen</i> there will be required—Carriers...	2
	Distributors	3
	Total	5
	For the <i>Hospital</i> —Carriers	2
	1 distributor for each 12 patients	1
	Total	3
	GRAND TOTAL	74

The water-supply gang will thus consist of—

1 Mate on pay of "Special" class and 74 men and women on "Class II" pay.

II.—Conservancy.

Guards.	One guard for each 8 gangs	5 men.
	For head-quarters camp	2 "
	Total	7
Sweepers.	For a camp of 4,000 not less than 16 sweepers will be required	16

The conservancy gang will therefore consist of—

- 1 Mate Guard on pay of "Special" class.
- 7 Guards on "Class I" pay.
- 1 Jamadar Sweeper on Rs. 8 a month.
- 16 Sweepers at Rs. 6 a month for men and Rs. 5 a month for women.

Sweepers will be paid 8 annas extra for burying a cholera corpse, and 3 annas for a corpse from any other cause.

III.—Hospital.

Two men will be required to assist in distributing medicines	2
An attendant for each six patients, male	1
Do. do., female	1
Total	4

These 4 will receive "Class II" wages.

IV.—Kitchens.

One cook will suffice for each 150 children. A gang muharrir is necessary to keep the attendance register and write up the returns required, and one warder to keep order.

V.—General.

Four Treasury guards will be necessary at the head-quarters camp, two for day and two for night. Two Dāk runners will also be needed; one Chaprasi for the Officer-in-charge; one Khalasi for each Work Agent; all these may be on the pay of the "Special" class.

APPENDIX IV.

FAMINE RELIEF-WORKS.

Table of Standard Tasks for Relief Workers.

Nature of work.	Reduced lead.)	QUANTITIES IN CUBIC FEET.			REMARKS.	
		Class I—Diggers.	Class II—Carriers.	Class III—Working children.		
MEASUREMENT BY—						
		Pit.	Bank.			
		C. Ft.	C. Ft.			
EARTHWORK.						
Soft earth ...	...	70	80	...	If the task is measured in the finished bank, 15 per cent. above the pit measurement must be taken.
Hard earth or soft moorum.	...	48	55	...		
Hard moorum	...	36	42	...		
Very hard moorum	...	24	28	...		
METAL-BREAKING.						
		C. Ft.	C. Ft.	C. Ft.	These tasks are merely given as a guide. The task in each case will have to be fixed with regard to the nature and hardness of the stone dealt with. * Class III or working children will rarely be employed on breaking, as they will be required to carry rubble to the breakers and remove the broken stone to stacks.	
Hard metal as basalt ...	...	4½	3	*1½	
Soft metal as sandstone ...	...	6	4	*2	
CARRIAGE.						
Lead in feet.	Lift in feet.			Carrier unit 10,000	Half-carrier unit 5,000.	
				C. Ft.	C. Ft.	
50	Up to 5 feet	146	...	68	34	Reduced lead = 36 + Lead + 12 × Lift. The maximum task for a carrier-unit is fixed at 10,000, i.e., 1 cubic foot carried 10 000 ft. The task = $\frac{10,000 \text{ (constant)}}{\text{Reduced lead.}}$ The number of carriers required = $\frac{T \text{ (task for diggers)} \times R \text{ (reduced lead)}}{10,000 \text{ (constant).}}$ or $\frac{T \text{ (task for diggers)}}{\text{Carrier task (from Table).}}$
100		196	...	51	25	
150		246	...	41	21	
200		296	...	34	17	
250		346	...	28	14	
300		396	...	25	13	
400		496	...	20	10	
500		596	...	17	8	
50	5 to 10 feet.	206	...	49	25	Example— A gang contains 20 diggers working in soft earthwork. Each digger's task is 70 cubic feet (pit measurement). ∴ Task for gang is, 20 × 70 = 1,400 cubic feet. The number of carriers required to carry this with a lead of 300 feet and a lift of 10 feet is— $\frac{1,400}{22 \text{ from Table}} = 66 \text{ say.}$ In making up the number Class III or working children are taken as half carrier units.
100		256	...	39	19	
150		306	...	33	17	
200		356	...	28	14	
250		406	...	25	13	
300		456	...	22	11	
400		556	...	18	9	
500		656	...	15	8	
50	10 to 15 feet.	266	...	38	19	On the ordinary work on which relief-workers are employed, such as a road in the plains, where the earth is soft and the lift and lead do not exceed 50 and 5 feet respectively, the number of carriers usually greatly in excess of actual requirements. A typical gang would contain 20 diggers, 50 carriers and 20 working children and the digger's task be (70 × 20) = 1,400 cubic feet. The carriers would equal 60 units and would only be doing a task of $\frac{1,400}{60} = 28$ cubic feet instead of 68 cubic feet, the full task. Now would they be doing a full carrier's task till the reduced lead was 42 equal, with a 5-foot lift, to a lead of 330 feet, or with a 10-foot lift to a lead of 270 feet.
100		316	...	32	16	
150		366	...	27	13	
200		416	...	24	12	
250		466	...	21	11	
300		516	...	19	9	
400		616	...	16	8	
500		716	...	14	7	
50	15 to 20 feet.	326	...	31	15	
100		376	...	27	14	
150		426	...	23	12	
200		476	...	21	11	
250		526	...	19	9	
300		576	...	17	8	
400		676	...	15	7	
500		776	...	13	6	
50	20 to 25 feet.	386	...	26	13	
100		436	...	23	12	
150		486	...	21	10	
200		536	...	19	9	
250		586	...	17	8	
300		636	...	16	8	
400		736	...	14	7	
500		836	...	12	6	

APPENDIX V.

FAMINE RELIEF WORKS.

THE EXACTION OF A TASK AND THE DUTIES OF GANG MUHARRIRS AND WORK AGENTS.

1. It cannot be too clearly understood that the exaction of a task depends in a great measure on the orderly and methodical arrangement of the relief-workers. All over-crowding must be carefully avoided, and it is better, when a rush of new applicants takes place, to form them into gangs and keep them apart from the workers until such time as the Work Agent can arrange for their employment. An undisciplined crowd should never be allowed to mix with the gangs already on the works; new gangs should remain seated under their appointed mates and should be taken in hand and told off to their work one by one.

The orderly arrangements
of the workers.

2. Whenever a gang is mustered or paid all members must be *seated* in straight rows in the classes in which they are entered in the register, and it is the Mate's duty to see that this is done quickly and in an orderly manner.

Method of mustering the
gangs.

3. A gang working on the task-work (*b*) system will consist of not more than 90 members, and an earth-work gang must contain, if possible, a sufficient number of diggers to keep the carriers employed. Each gang will be in charge of a mate, who will wear a badge with the index number of his gang, and will also be supplied with a flag with the same number on it in large figures.

Limiting number in a gang.
The Mate's charge.

The Muharrir's charge.
The Work Agent's charge
and duties.

Each Muharrir will be in charge of from five to six hundred workers, and wherever it is possible a Work Agent will be appointed for every 2,000 workers.

The duties of the Gang Muharrir are set forth in detail below; the Work Agent will confine himself to professional matters and to the orderly arrangement of workers as set forth in separate instructions for Earth-work and Metal-breaking Camps.

4. The gangs will be re-formed at the beginning of each week, and no new-comers will be allowed into the gang during the week; the numbers will thus either remain constant or will diminish by absentees. All new-comers during the week will be formed into new gangs.

Formation of gangs.

5. Each Muharrir is to be provided with a printed wage list, and the entries on the gang register will depend upon the column in this table on which payments are being made; the Muharrir will then proceed as follows on *Task-work* charges:—

Wage list.

Early in the morning he musters his gangs on the work as described in paragraph 2, divides them correctly into classes and enters the number of each class; *no names are to be called or written*; he then fills up the amount column calculated at the highest prescribed rate of wages for each class, on the assumption that the gang will complete their task, and enters the total for workers and gratuitous.

Mustering the gangs.
Nominal rolls not required.
Method of writing up the
gang register.

This completes the morning entries in each register.

6. Early in the afternoon he again goes round his gangs and notes if the "work done" on the *previous* day, as entered by Work Agent under that day, corresponds with the task due for that day; if it does not, he calculates the fines from the Mate and classes I and II, enters the amount, deducts it from the total entered in the morning of the previous day, and writes down the resulting amount opposite the heading "Amount paid for that day".

Calculation of fines for an
unfinished task.

7. At 3 or 4 o'clock in the afternoon, depending upon the length of the day and the time of the year, the Muharrir applies to the Officer-in-charge for the money to pay his gangs for the previous day and signs for the amount he takes away. On arrival at each gang he musters them as prescribed, *each class entered in the register being seated in separate rows and counted*, to see that the numbers agree with the entries before payment is commenced.

Payment of the gangs.

After payment he signs the register, and takes it with him, returning it to the Mate the first thing next morning.

Method of payment. 8. The method of payment will be as follows :—

In the first place a number of bags must be got ready, and on each bag is to be shown a number corresponding to the index-number of each gang. From the morning entries of the previous day, as described in paragraph 5, the Muharrir knows exactly the amount which will have to be paid supposing each gang does its full task ; he takes a note of these totals in his note-book, which he shows on his return to the Officer-in-charge, and finds that the amount required is between Rs. 7 and Rs. 8 for each gang.

To avoid the delay in counting out the exact number of annas and pice, which is different for each gang, the Officer-in-charge makes up bags containing coppers and small coins of exactly, say, Rs. 8 each, and hands these over to the Muharrir with the index-numbers on them corresponding to the gang numbers in charge of the latter.

9. When the Muharrir has made the payments he ties up the balance of the money in the bag pertaining to each gang and returns it to the Officer-in-charge with the gang register, and on his ascertaining that the balance in each bag is the correct difference between the Rs. 8 given out and the entry in the column "Amount paid," he returns the register to the Muharrir.

10. The Muharrir then proceeds to write up his day-book, a sample of which will be supplied to him as a guide, and he will give this in the same evening to the Officer-in-charge, so that that officer may make the entries in his own day-book and from thence into his cash book.

11. If the Charge is being worked on the "Intermediate" system, the exact meaning of which will be described elsewhere, the forms and the procedure will be exactly the same up to the morning entries, but there will be no dependants, as these will be provided for elsewhere. The gangs in this case will be smaller and contain from 20 to 30 workers, as far as possible from one village.

Instead however of fines from individuals being calculated and deducted, it will be ascertained by the nearest simple one-eighth fraction what proportion the task done bears to that due, and deductions on account of short work if any will be made from the wages of each class of workers except the working children, according to the following table:—

Table showing the wages due for "short work" under the Intermediate System.

Full wages in pice.	Wages in pice for short work.							Remarks
	Proportion of work done to task set.							
	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	
4	1	1	1	2	2	3	3	1. The Gang Muharrir simply musters the workers in the morning without calculating the wages
5	1	1	2	2	3	4	4	2. The Work Agent in measuring up the work done on the <i>previous</i> day notes the proportion of work done to task set.
6	1	1	2	3	4	4	5	
7	1	2	3	3	4	5	6	
8	1	2	3	4	5	6	7	
9	1	2	3	4	6	7	8	3. Guided by this "proportion," which must invariably be expressed in the simple one-eighth fractions, the Gang Muharrir calculates the wages to be paid according to this table in the afternoon, and pays the gang accordingly.
10	1	2	4	5	6	7	9	
11	1	3	4	5	7	8	10	4. The working children are not to be fined.
12	1	3	4	6	7	9	10	
13	1	3	5	6	8	10	11	
14	2	3	5	7	9	10	12	
15	2	4	6	7	9	11	13	
16	2	4	6	8	10	12	14	
17	2	4	6	8	10	13	15	

12. Payments in this case will not however be made to each individual member of the gang, but the total due will be paid over in a lump sum to the head-man of the gang for distribution; each class of workers should, however, be distinctly told what wages they are to get.

The head-man or Mate will in this case be selected by the members of the gang, and as far as possible the gang will be composed of members of one or two villages.

13. The Work Agent's duty each morning is (i) to calculate the task correctly and to set out the work to be done for that day, and to see that all workers are arranged in a manner calculated to ensure a proper task being performed; (ii) to measure up the task performed on the *previous* day and enter the result in the gang register under *that* day (*vide* paragraph 6); (iii) in the case of Task-work gangs, to assess fines for short work if any; and (iv) in the case of intermediate workers, to enter on the appropriate line the nearest simple fraction representing the proportion of work done to task set.

14. The general principle to be remembered is that (a) the number of workers, (b) the task set, (c) the task performed, (d) the deficiency of work done and fines inflicted if any, and (e) the payments made for any one day should all be entered under the same day in the appropriate columns. Particulars relating to one day must not be mixed up with those relating to another.

15. The procedure then will be as follows, supposing the opening day of Camp to be Sunday, which is the most convenient day for opening a Camp:—

Day of the week.	Remarks.
	<i>Opening day of Camp.</i>
Sunday ...	Classify workers, and form gangs. (<i>N. B.</i>)—No measurements, no payments, <i>vide</i> General Order, para. 33.)
Monday ...	<i>Morning</i> .—Muster the gangs as formed on Sunday, and enter under Monday. Set out task for Monday and enter task due under Monday. <i>Evening</i> .—Pay <i>Sunday</i> wages and enter under Sunday.
Tuesday ...	<i>Morning</i> .—Muster the gangs under Tuesday; set out task for Tuesday and enter task due under Tuesday. Measure up task performed on Monday and enter under Monday, noting at the same time deficiency if any in the case of task-work and proportion of work done to task set in the case of Intermediate gangs. <i>Evening</i> .—Inflict fines if any and pay up gangs for Monday's work on actual measurements, and complete register for Monday. (<i>N. B.</i>)—1 Do not fill up depleted gangs. New-comers* go to the kitchen or are formed into fresh gangs and sent to the works.
	2. Until the new-comers are sufficiently numerous to be formed into regular gangs, they should be employed on miscellaneous works, <i>e. g.</i> side-tracks, cleaning jungle, finishing off work done by the regular gangs, &c., and kept quite separate from the old gangs. When they increase to a sufficient number, form them into fresh regular gangs and set them proper tasks in the usual manner.)

* The procedure as regards new comers will be as follows:—

- (a) Suppose *A* comes on Tuesday, *A* will get a kitchen ration on Tuesday, *if in need of it*.
- (b) On Wednesday, *A* will work, but will not be paid; he will again, *if in need of it*, get a kitchen ration.
- (c) On Thursday, *A* will be paid for Wednesday's work; and so on.

Date of the week.	Remarks.
Wednesday ...	As above, complete register for Tuesday.
Thursday ...	" " " Wednesday.
Friday ...	" " " Thursday.
Saturday ...	" " " Friday.
Sunday ...	<p><i>Morning.</i>—Measure up work done on Saturday and pay the gangs, entering all payments and measurements, &c., under <i>Saturday</i>, thus completing the register for week ending <i>Saturday</i>. Close work. Let the workers have a holiday. Compile weakly and other returns and submit those that are due.</p> <p><i>Evening.</i>—Re-form gangs and make up depleted gangs to full strength. As far as possible have old hands and newcomers in separate gangs. Then under Sunday complete all entries for Sunday for those of the old hands who are entitled to the Sunday wages, <i>viz.</i>, those who have been on the work at least 3 days in the preceding week.</p>
Monday ...	<p><i>Morning.</i>—Muster the gangs under Monday as re-formed on Sunday evening. Set out the task for Monday and enter task due under Monday.</p> <p><i>Evening.</i>—Pay all old hands their Sunday wages and enter under Sunday. No measurements on this day.</p>
Tuesday onwards ...	Proceed as indicated above.

15. The procedure then will be as follows, supposing the opening day of Camp to be Sunday, which is the most convenient day for opening a Camp:—

Day of the week	Remarks.
<i>Opening day of Camp.</i>	
Sunday	... Classify workers, and form gangs. (N. B.—No measurements, no payments, <i>vide</i> General Order, para. 33)
Monday	... <i>Morning</i> .—Muster the gangs as formed on Sunday, and enter under Monday. Set out task for Monday and enter task due under Monday. <i>Evening</i> .—Pay Sunday wages and enter under Sunday.
Tuesday	... <i>Morning</i> .—Muster the gangs under Tuesday; set out task for Tuesday and enter task due under Tuesday. Measure up task performed on Monday and enter under Monday, noting at the same time deficiency if any. <i>Evening</i> .—Inflict fines if any and pay up gangs for Monday's work on actual measurements, and complete register for Monday. (N. B.—1. Do not fill up depleted gangs. New-comers go to the kitchen or are formed into fresh gangs and sent to the works. 2. Until the new-comers are sufficiently numerous to be formed into regular gangs, they should be employed on miscellaneous works, <i>e. g.</i> , side-tracks, cleaning jungle, finishing off work done by the regular gangs, &c., and kept quite separate from the old gangs. When they increase to a sufficient number, form them into fresh regular gangs and set them proper tasks in the usual manner.)
Wednesday	.. As above, complete register for Tuesday.
Thursday	... " " " Wednesday.
Friday	... " " " Thursday.
Saturday	... " " " Friday.
Sunday	... <i>Morning</i> .—Measure up work done on Saturday and pay the gangs, entering all payments and measurements, &c., under Saturday, thus completing the register for week ending Saturday. Close work. Let the workers have a holiday. Compile weekly and other returns and submit those that are due. <i>Evening</i> .—Re-form gangs and make up depleted gangs to full strength. As far as possible have old hands and new-comers in separate gangs. Then under Sunday complete all entries for Sunday for those of the old hands who are entitled to the Sunday wages, <i>viz.</i> , those who have been on the work at least 3 days in the preceding week.
Monday	... <i>Morning</i> .—Muster the gangs under Monday as re-formed on Sunday evening. Set out the task for Monday and enter task due under Monday. <i>Evening</i> .—Pay all old hands their Sunday wages and also all new-comers that worked on Monday in the re-formed gangs and enter under Sunday. No measurements on this day.
Tuesday onwards	... Proceed as indicated above.

APPENDIX VI.

FAMINE RELIEF-WORKS.

NEW ROAD CONSTRUCTION—EARTHWORK.

In order to avoid all crowding, each gang, which will contain not more than 90 workers, will be spaced four chains apart, and will complete the work in this length before being moved on.

2. No excavation is to commence until the centre line (*c*), the outside pit lines (*a*) and (*e*), inside pit lines (*b*) and (*d*), and the 20-feet spaces between the pits have all been nicked out on the ground. The standard dimensions, which must be strictly adhered to, are all shown on the accompanying sketch. The roadway will have a formation width of 21 feet in bank and cutting.

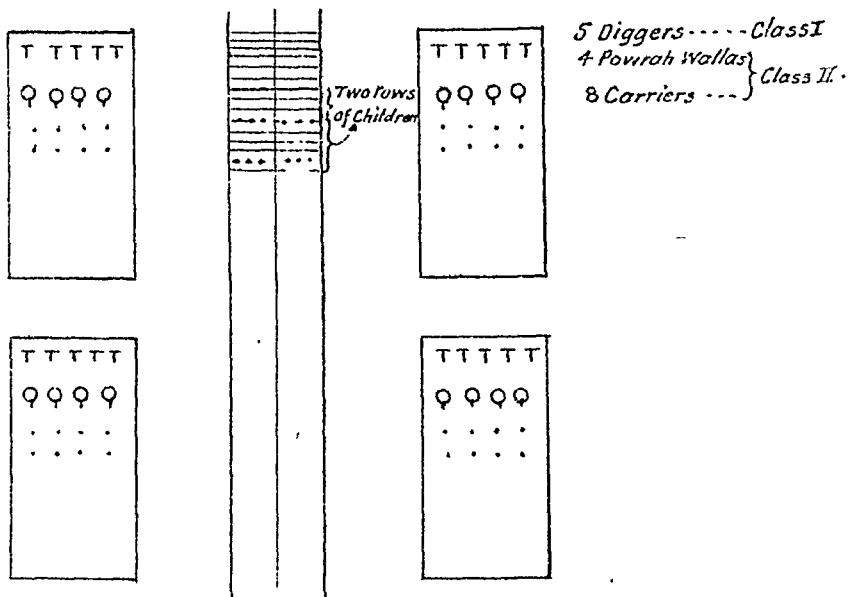
3. No excavation is to be made except from the regular pits or nearer than 40 feet from the centre line of the road. The pits should be taken out for an even depth of one foot, and can then be deepened if more earth is required.

4. If a gang contained—

20 Class I diggers, and
50 men and women, } Class II and III carriers,
14 children, age 8—12 }

or 84 workers in all, a good distribution of work would be as follows:—

5 diggers in each pit	...	...	...	20
4 Class II powrah-wallas	...	...	...	16
8 Class II carriers	...	...	...	32
2 Class II men on road bank directing the carriers	...	...	...	2
14 children breaking clods and dressing bank	...	...	...	14
		Total	...	84

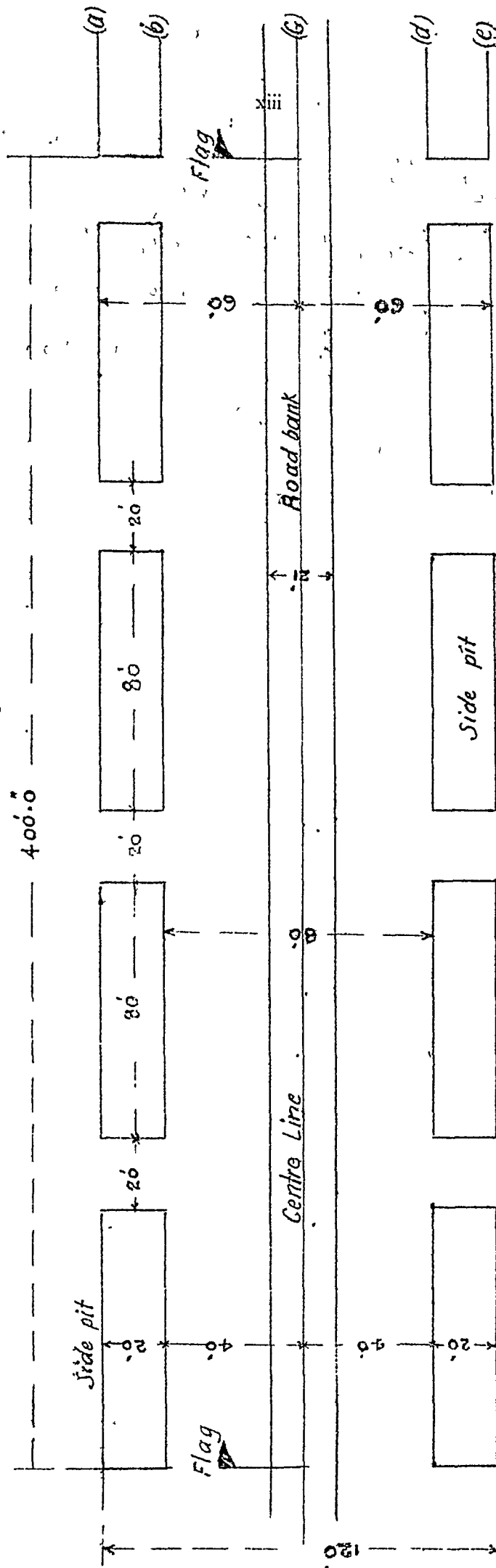


5. The above sketch shows the distribution, and the greatest care must be taken to make a methodical division in each gang, as the tendency of the workers is to crowd together into one pit, in which case the exaction of an adequate task becomes hopeless.

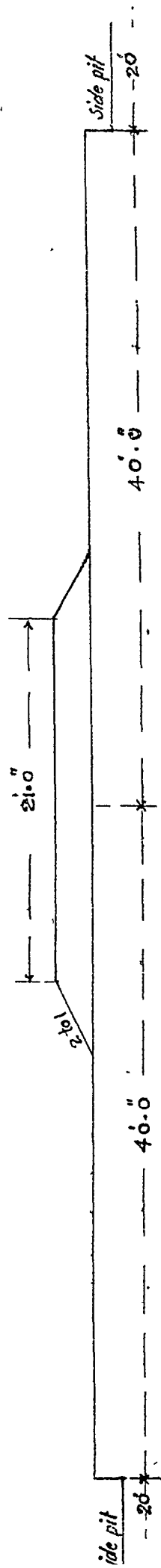
6. These may appear petty matters to set forth in such detail,[†] but it must be remembered that the great majority of Work Agents are without experience, and even very few Sub-Overseers on the Public Works establishment have any ideas of organizing a crowd.

ARRANGEMENT OF SIDE PITS FOR ROAD BANK

Space for one gang



CROSS SECTION



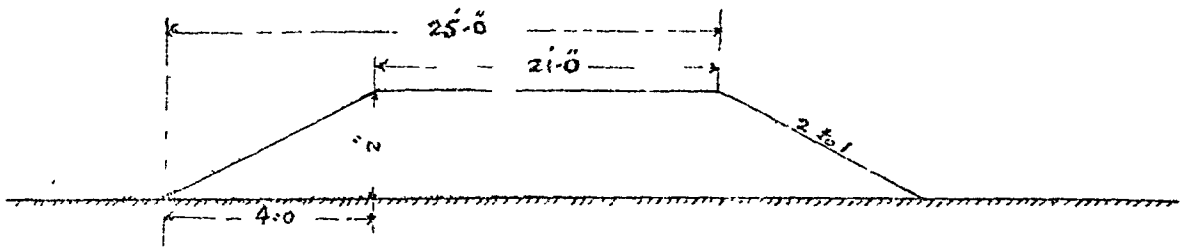
APPENDIX VII.

FAMINE RELIEF-WORKS.

SETTING OUT AND MEASUREMENT OF EARTHWORK TASK.

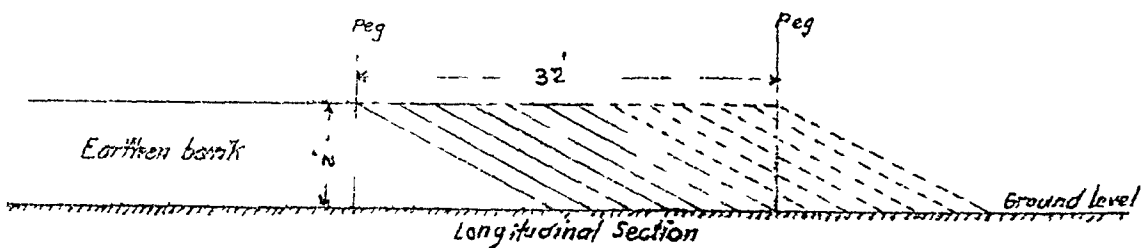
1. On famine relief-works where measurements have to be made daily it has been found that the only practicable method is to make them from the road bank section, but in this case the task must be taken at 15 per cent. above that for pit excavation, as shown in the Table of standard tasks for Relief-workers.

As an example, take an ordinary road bank 2 feet high—the section will be $25 \times 2 = 50$ square feet:—



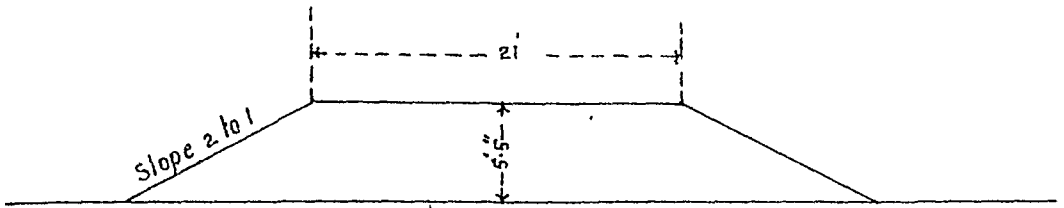
2. If the gang has 20 diggers and the task is 80 cubic feet per head, the total quantity to be done is $20 \times 80 = 1,600$ cubic feet; and as the section in this particular case is 50 square feet, the *length* of bank which represents the task will be $\frac{1600}{50} = 32$ running feet.

3. The above calculations are made daily by the Work Agent for each gang, and a long bamboo peg is set up to show the length of bank to be done. Setting out the task. It is advisable at the same time to nick a line on the ground at the peg, as it is otherwise liable to be altered. By marking the *length* of the task out in this way the gang can understand exactly what is expected of them. The mates must be made to understand that the bank must be carried on in rough section at the full height, thus:—



EARTHWORK TABLES.

SECTION OF ROAD IN BANK.



EXAMPLE :

Height of bank is 5.5 feet for which, with slopes 2 to 1, the table gives 176 sq. ft. area.

If the length of the bank be 100 feet then the contents will be $100 \times 176 = 17,600$ cft.

EARTHWORK TABLES.

For Banks : Top width 21 feet (vide Type Cross Section).

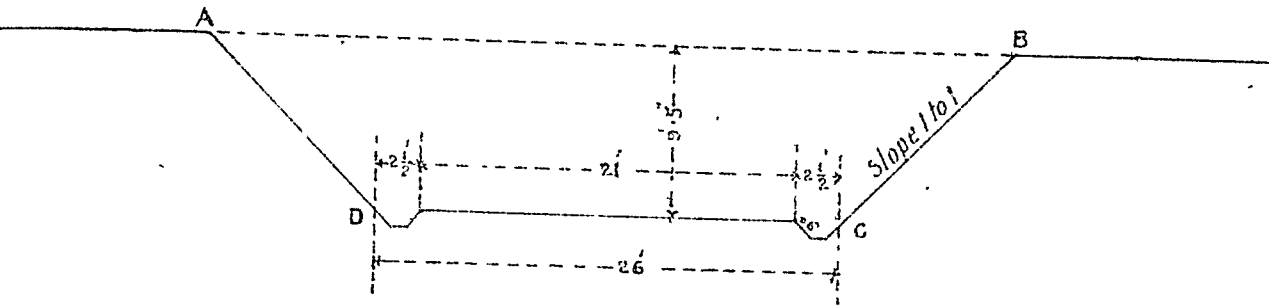
Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.	
	Slope 1½ : 1.	Slope 2 : 1.		Slope 1½ : 1.	Slope 2 : 1.		Slope 1½ : 1.	Slope 2 : 1.		Slope 1½ : 1.	Slope 2 : 1.		Slope 1½ : 1.	Slope 2 : 1.
0.1	2	2	3.1	80	84	6.1	184	203	9.1	315	357	12.1	474	547
0.2	4	4	3.2	83	88	6.2	188	207	9.2	320	363	12.2	479	554
0.3	6	7	3.3	86	91	6.3	192	212	9.3	325	368	12.3	485	561
0.4	9	9	3.4	89	95	6.4	196	216	9.4	330	374	12.4	491	568
0.5	11	11	3.5	92	98	6.5	200	221	9.5	335	380	12.5	497	575
0.6	13	13	3.6	95	102	6.6	204	226	9.6	340	386	12.6	503	582
0.7	15	16	3.7	98	105	6.7	208	230	9.7	345	392	12.7	509	590
0.8	18	18	3.8	102	109	6.8	212	235	9.8	350	399	12.8	515	596
0.9	20	21	3.9	105	112	6.9	216	240	9.9	355	404	12.9	521	604
1.0	23	23	4.0	108	116	7.0	221	245	10.0	360	410	13.0	527	611
1.1	25	26	4.1	111	120	7.1	225	250	10.1	365	417	13.1	533	618
1.2	27	28	4.2	115	124	7.2	229	255	10.2	370	422	13.2	538	625
1.3	30	30	4.3	118	127	7.3	233	260	10.3	375	429	13.3	545	633
1.4	32	33	4.4	121	131	7.4	238	265	10.4	381	435	13.4	551	641
1.5	35	36	4.5	125	135	7.5	242	270	10.5	386	441	13.5	557	648
1.6	37	39	4.6	128	139	7.6	246	275	10.6	392	447	13.6	563	655
1.7	40	41	4.7	132	143	7.7	251	280	10.7	397	454	13.7	569	663
1.8	43	44	4.8	135	147	7.8	255	286	10.8	402	460	13.8	575	671
1.9	45	47	4.9	139	151	7.9	260	291	10.9	407	467	13.9	582	678
2.0	48	50	5.0	143	155	8.0	264	296	11.0	413	473	14.0	588	686
2.1	51	53	5.1	146	159	8.1	268	301	11.1	418	480	14.1	594	694
2.2	54	56	5.2	150	163	8.2	273	307	11.2	423	486	14.2	601	701
2.3	56	59	5.3	153	168	8.3	278	312	11.3	429	493	14.3	607	709
2.4	59	62	5.4	157	172	8.4	282	318	11.4	434	499	14.4	614	717
2.5	62	65	5.5	161	176	8.5	287	323	11.5	440	506	14.5	620	725
2.6	65	68	5.6	165	180	8.6	292	329	11.6	446	513	14.6	626	733
2.7	68	71	5.7	168	185	8.7	297	334	11.7	451	519	14.7	633	741
2.8	71	75	5.8	172	189	8.8	301	340	11.8	457	526	14.8	640	749
2.9	74	78	5.9	176	194	8.9	306	345	11.9	462	533	14.9	646	757
3.0	77	81	6.0	180	198	9.0	311	351	12.0	468	540	15.0	653	765

EARTHWORK TABLES.—(Concl'd.)

For Banks: Top width 21 feet (vide Type Cross Section).

Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.		Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.	
	Slope 1½:1.	Slope 2:1.		Slope 1½:1.	Slope 2:1.		Slope 1½:1.	Slope 2:1.		Slope 1½:1.	Slope 2:1.		Slope 1½:1.	Slope 2:1.
15.1	659	774	16.1	727	857	17.1	798	944	18.1	872	1,035	19.1	948	1,131
15.2	666	782	16.2	734	865	17.2	805	953	18.2	879	1,045	19.2	956	1,140
15.3	673	790	16.3	741	874	17.3	813	963	18.3	887	1,054	19.3	965	1,150
15.4	679	798	16.4	748	883	17.4	820	971	18.4	894	1,064	19.4	972	1,160
15.5	686	806	16.5	755	891	17.5	827	979	18.5	902	1,073	19.5	980	1,171
15.6	693	815	16.6	762	900	17.6	834	989	18.6	909	1,082	19.6	988	1,180
15.7	700	823	16.7	769	908	17.7	842	999	18.7	917	1,092	19.7	996	1,190
15.8	706	831	16.8	776	917	17.8	849	1,008	18.8	925	1,101	19.8	1,004	1,200
15.9	713	840	16.9	783	926	17.9	857	1,017	18.9	933	1,111	19.9	1,012	1,210
16.0	720	848	17.0	791	935	18.0	864	1,026	19.0	941	1,121	20.0	1,020	1,220

SECTION OF ROAD IN CUTTING.



EXAMPLE:

Depth of cutting is 9.5 feet, for which, with slopes 1 to 1, the table gives 337 sq. ft. area.

If the length of the cutting be 100 feet then the contents will be $100 \times 337 = 33,700$ cft.

N. B.—The area given in the Tables excludes the drains.

EARTHWORK TABLES.

For Cuttings: Bottom width 26' (vide Type Cross Section).

Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.					Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.				
	Slope 1/2 : 1.	Slope 3/4 : 1.	Slope 1 : 1.	Slope 1 1/2 : 1.	Slope 2 : 1.		Slope 1/2 : 1.	Slope 3/4 : 1.	Slope 1 : 1.	Slope 1 1/2 : 1.	Slope 2 : 1.
0.1	3	3	3	3	3	3.1	83	85	90	95	100
0.2	5	5	5	5	5	3.2	86	88	93	99	104
0.3	8	8	8	8	8	3.3	88	91	97	102	108
0.4	10	11	11	11	11	3.4	91	94	100	106	112
0.5	13	13	13	13	14	3.5	94	97	103	109	116
0.6	16	16	16	16	16	3.6	97	100	107	113	120
0.7	18	18	19	19	19	3.7	100	103	110	117	124
0.8	21	21	21	22	22	3.8	102	106	113	121	128
0.9	24	24	24	25	25	3.9	105	109	117	125	132
1.0	26	27	27	28	28	4.0	108	112	120	128	136
1.1	29	29	30	30	31	4.1	111	115	123	132	140
1.2	32	32	33	33	34	4.2	114	118	127	136	144
1.3	34	35	36	36	37	4.3	116	121	130	140	149
1.4	37	37	38	39	40	4.4	119	124	134	143	153
1.5	40	40	41	42	44	4.5	122	127	137	147	158
1.6	42	43	44	45	47	4.6	125	130	141	151	162
1.7	45	46	47	48	50	4.7	128	133	144	155	166
1.8	48	48	50	52	53	4.8	131	136	148	159	171
1.9	50	51	53	55	57	4.9	133	139	151	163	175
2.0	53	54	56	58	60	5.0	136	143	155	168	180
2.1	56	57	59	61	63	5.1	139	146	159	172	185
2.2	58	60	62	65	67	5.2	142	149	162	176	189
2.3	61	62	65	68	70	5.3	145	152	166	180	194
2.4	63	65	68	71	74	5.4	148	155	170	184	199
2.5	67	68	71	74	78	5.5	151	158	173	188	204
2.6	69	71	74	78	81	5.6	153	161	177	193	208
2.7	72	74	77	81	85	5.7	156	164	181	197	213
2.8	75	77	81	85	89	5.8	159	167	184	201	218
2.9	78	80	84	88	92	5.9	162	171	188	205	223
3.0	80	83	87	92	96	6.0	165	174	192	210	228

EARTHWORK TABLES.—(Contd.)

For Cuttings: Bottom width 26' (vide Type Cross Section).—(Contd.)

Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.					Mean depth - in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.				
	Slope ½:1.	Slope ¾:1.	Slope 1:1.	Slope 1½:1.	Slope 2:1.		Slope ½:1.	Slope ¾:1.	Slope 1:1.	Slope 1½:1.	Slope 2:1.
6.1	168	177	196	214	233	9.1	257	278	319	361	402
6.2	171	180	200	219	238	9.2	260	282	324	366	408
6.3	174	184	204	223	243	9.3	263	285	328	372	415
6.4	177	187	207	228	248	9.4	267	289	333	377	421
6.5	180	190	211	232	254	9.5	270	292	337	382	428
6.6	183	193	215	237	259	9.6	273	296	342	388	434
6.7	185	197	219	241	264	9.7	276	299	346	394	441
6.8	188	200	223	246	269	9.8	279	303	351	399	447
6.9	191	203	227	251	275	9.9	282	307	356	405	454
7.0	194	207	231	256	280	10.0	285	310	360	410	460
7.1	197	210	235	260	285	10.1	288	314	365	416	467
7.2	200	213	239	265	291	10.2	291	317	369	421	473
7.3	203	217	243	270	297	10.3	294	321	374	427	480
7.4	206	220	247	275	302	10.4	298	325	379	433	487
7.5	209	224	252	280	308	10.5	301	328	383	438	494
7.6	212	227	255	284	313	10.6	304	332	388	445	500
7.7	215	230	259	289	319	10.7	307	336	393	450	508
7.8	218	233	264	294	325	10.8	310	339	397	456	514
7.9	221	237	268	300	331	10.9	313	343	402	462	521
8.0	224	240	272	304	336	11.0	316	347	407	468	528
8.1	227	243	276	308	341	11.1	319	350	412	473	535
8.2	230	247	280	314	348	11.2	323	354	417	479	542
8.3	233	250	285	319	353	11.3	326	358	422	485	549
8.4	236	254	289	324	359	11.4	329	361	426	491	556
8.5	239	257	293	329	366	11.5	332	365	431	497	564
8.6	242	261	298	335	372	11.6	335	369	436	504	571
8.7	245	264	302	340	378	11.7	338	373	441	509	578
8.8	248	268	306	345	384	11.8	341	376	446	516	585
8.9	251	271	310	350	390	11.9	345	380	451	522	593
9.0	254	275	315	356	396	12.0	348	384	456	528	600

EARTHWORK TABLES.—(Contd.)

For Cuttings: Bottom width 26' (vide Type Cross Section).—(Contd.)

Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.					Mean depth in feet	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.				
	Slope ½:1.	Slope ¾:1.	Slope 1:1.	Slope 1½:1.	Slope 2:1.		Slope ½:1.	Slope ¾:1.	Slope 1:1.	Slope 1½:1.	Slope 2:1.
12.1	351	388	461	534	607	15.1	450	507	621	735	849
12.2	354	392	466	540	615	15.2	453	511	626	742	858
12.3	357	396	471	547	623	15.3	456	515	632	749	866
12.4	361	399	476	553	630	15.4	460	519	638	756	875
12.5	364	403	481	559	638	15.5	463	523	643	764	885
12.6	367	407	486	566	645	15.6	467	527	649	771	893
12.7	370	411	492	572	653	15.7	470	531	655	778	901
12.8	373	415	497	579	660	15.8	473	536	660	785	910
12.9	377	419	502	585	668	15.9	477	540	666	793	919
13.0	380	423	507	592	676	16.0	480	544	672	800	928
13.1	383	426	512	598	684	16.1	483	548	678	807	937
13.2	387	430	517	604	691	16.2	487	552	684	815	946
13.3	390	434	523	611	700	16.3	490	556	690	823	955
13.4	393	438	528	618	708	16.4	494	561	695	830	965
13.5	397	442	533	625	716	16.5	497	565	701	837	974
13.6	400	446	538	631	723	16.6	501	569	707	845	983
13.7	403	450	544	638	732	16.7	504	574	713	852	991
13.8	406	454	549	644	740	16.8	507	578	719	860	1,001
13.9	410	458	555	651	748	16.9	511	582	725	868	1,010
14.0	413	462	560	658	756	17.0	514	587	731	876	1,020
14.1	416	466	566	665	764	17.1	518	591	737	883	1,029
14.2	420	470	571	672	772	17.2	521	595	743	891	1,039
14.3	423	474	576	678	781	17.3	525	600	749	899	1,049
14.4	426	478	582	685	789	17.4	528	604	755	907	1,058
14.5	430	482	587	692	798	17.5	532	608	761	914	1,068
14.6	433	486	593	699	806	17.6	535	612	767	922	1,077
14.7	436	490	598	707	815	17.7	539	617	774	930	1,087
14.8	440	494	604	714	823	17.8	542	621	779	938	1,097
14.9	443	498	609	720	831	17.9	546	626	786	946	1,106
15.0	446	503	615	727	840	18.0	549	630	792	954	1,116

EARTHWORK TABLES.—(Concl'd.)

For Cuttings: Bottom width 26' (vide Type Cross Section).—(Concl'd.)

Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.					Mean depth in feet.	TOTAL AREA INCLUDING SIDE SLOPES IN SQUARE FEET.				
	Slope ½:1.	Slope ¾:1.	Slope 1:1.	Slope 1½:1.	Slope 2:1.		Slope ½:1.	Slope ¾:1.	Slope 1:1.	Slope 1½:1.	Slope 2:1.
18.1	553	634	798	962	1,126	19.1	588	679	861	1,044	1,226
18.2	556	639	804	970	1,136	19.2	591	684	868	1,052	1,236
18.3	560	643	811	978	1,145	19.3	595	688	875	1,061	1,246
18.4	563	648	817	986	1,156	19.4	599	693	881	1,069	1,257
18.5	567	652	823	994	1,166	19.5	602	697	888	1,078	1,268
18.6	570	651	829	1,002	1,175	19.6	606	702	894	1,086	1,278
18.7	574	661	836	1,011	1,186	19.7	609	706	900	1,094	1,289
18.8	577	665	842	1,019	1,195	19.8	613	711	907	1,103	1,299
18.9	581	670	849	1,027	1,206	19.9	616	715	913	1,111	1,309
19.0	584	675	855	1,035	1,216	20.0	620	720	920	1,120	1,320

CENTRAL PROVINCES, PUBLIC WORKS DEPARTMENT.

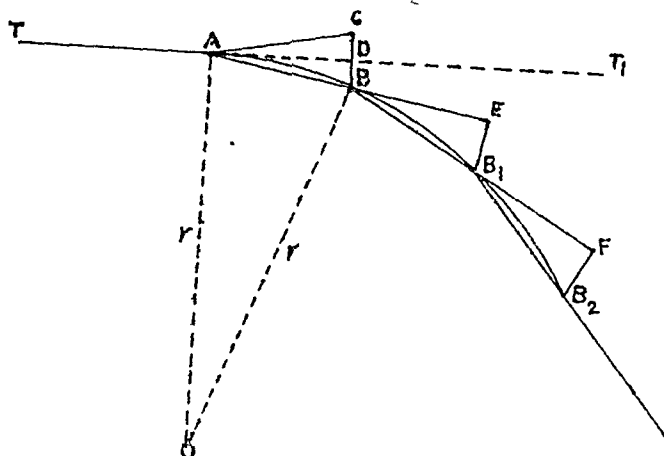
TABLE OF RADII, CHORDS AND OFF-SETS

FOR

LAYING OUT SIMPLE CURVES.

TABLE OF RADII, CHORDS AND OFF-SETS FOR LAYING OUT SIMPLE CURVES.

EXAMPLE:



In this sketch $BC = \frac{AB^2}{AO} = \frac{\text{Chord}^2}{\text{Radius}}$. The curve begins at A and points in it, say 100 feet apart, are required to be shown. Make AD in the prolongation of the tangent TA equal to 100 feet and at D set off DB at right angles to AD and equal to half BC. This determines B, the first point in the curve. Now range BE in line with AB and make $BE = AB = 100$ feet. On BE as base, make a triangle having $BB_1 = 100$ feet and $B_1E = BC$ (the calculated off-set). This determines the second point B₁ in the curve. The remaining points are found in a similar manner until the other tangent point is reached, at which half of the off-set BC should be set off if the length of the last chord be full (100 feet). If the tangent point occurs at a fraction of the last chord, then set off a proportionate length of the half off-set.

Table of Radii, Chords and Off-sets for laying out simple curves.

Radius in feet.	Chord in feet.	Off-set in feet and inches.		Radius in feet.	Chord in feet.	Off-set in feet and inches.	
		Feet.	Inches.			Feet.	Inches.
50	8	1	3	380	40	4	3
60	8	1	1	390	40	4	1
70	8	0	11	400	40	4	0
80	8	0	10	410	50	6	1
90	8	0	9	420	50	5	11
100	10	1	0	430	50	5	10
110	10	0	11	440	50	5	8
120	10	0	10	450	50	5	7
130	10	0	9	460	50	5	5
140	10	0	9	470	50	5	4
150	10	0	8	480	50	5	3
160	15	1	5	490	50	5	1
170	15	1	4	500	50	5	1
180	15	1	3	550	50	4	6
190	20	2	2	600	50	4	2
200	20	2	0	650	50	3	10
210	25	3	0	700	50	3	7
220	25	2	10	750	50	3	4
230	25	2	9	800	50	3	1
240	25	2	8	850	50	2	11
250	25	2	6	900	50	2	9
260	30	3	5	950	50	2	8
270	30	3	4	1,000	50	2	6
280	30	3	3	1,100	50	2	3
290	30	3	1	1,200	50	2	1
300	30	3	0	1,300	50	1	11
310	35	3	11	1,400	50	1	9
320	35	3	10	1,500	100	6	8
330	35	3	9	1,600	100	6	3
340	40	4	9	1,700	100	5	11
350	40	4	7	1,800	100	5	7
360	40	4	5	1,900	100	5	3
370	40	4	4	2,000	100	5	0

APPENDIX VIII.

FAMINE RELIEF-WORKS.

THE ARRANGEMENT OF GANGS IN METAL-BREAKING CAMPS AND
THE SETTING OUT AND MEASUREMENT OF THE TASK.

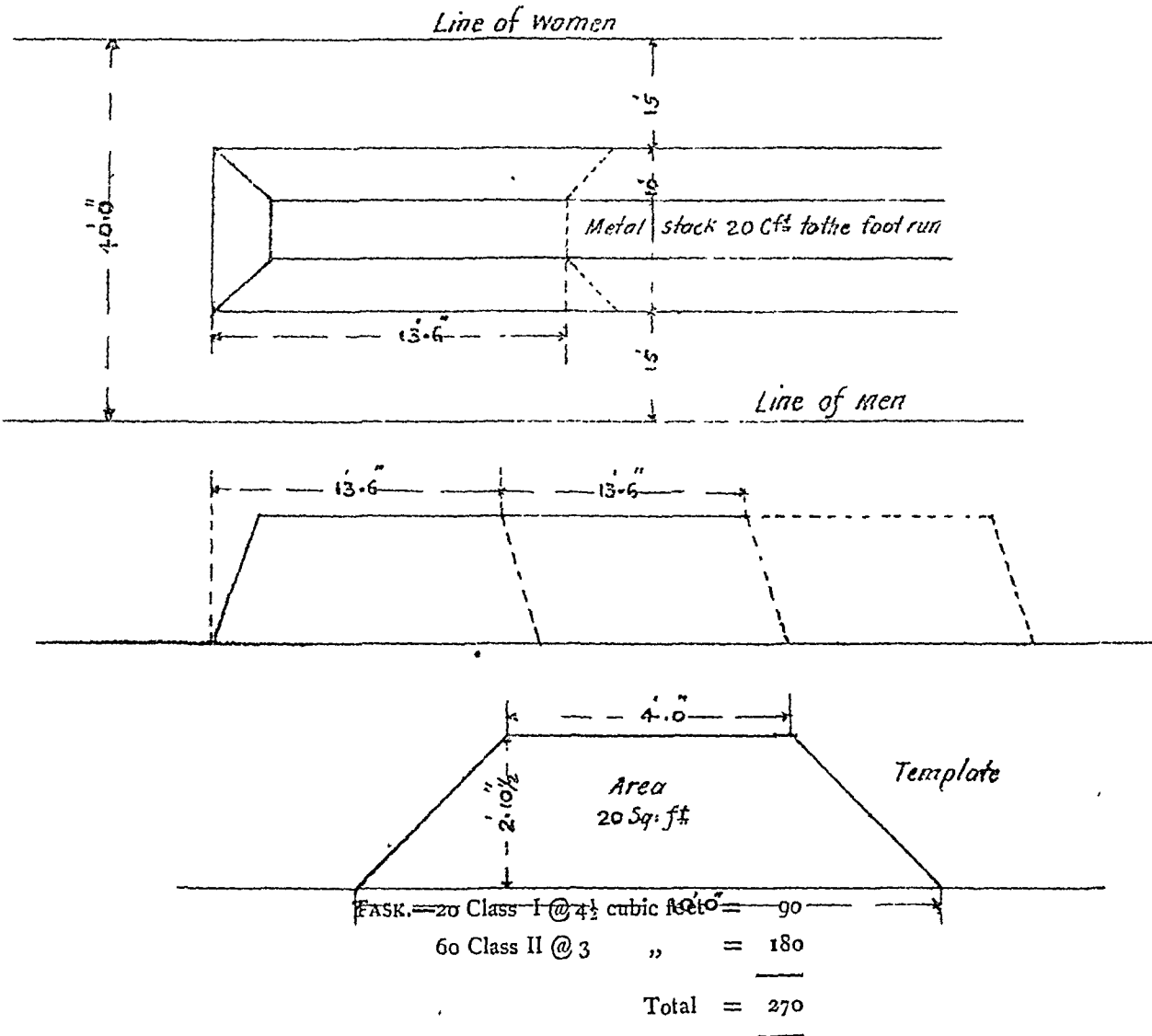
Metal-breaking camps. 1. There are two kinds of metal-breaking camps :

- (i) where metal is broken at the quarry ;
- (ii) at the roadside.

The latter are preferable wherever rubble can be collected in sufficient quantities.

2. When the camp is at a quarry, the men and women breakers are to be seated in two rows opposite each other at a distance of 40 feet apart, and between them is the metal stack, having a capacity of 20 cubic feet to the foot run.

Quarry camps
Arrangement of workers
and size of template.



All children are employed in carrying.

Length of Task $\frac{270}{20} = 13' 6''$.

3. In the example given the task is 270 cubic feet, and as the template area is 20 square feet, the *length* of the stack to represent the task is 13' 6".
 Setting out the task. This is marked by long bamboo pegs, and lines should also be nicked out on the ground as the pegs are liable to be removed.
4. As the metal is broken it is stacked continuously, so that the gang see their work growing before them and know exactly what remains to be done.
 Stacking the metal.
5. The gang may stop work immediately the task set out is finished.
 Completion of task.
6. The length of the stack should be arranged to allow of at least 10 days' work for the gang.
 Length of stack.
7. The lines on which the workers are to be seated as well as the outside edges of the stack should all be nicked out on the ground before work is commenced.
 Marking out the lines.
8. When the camp is at the roadside, the gangs are to be spaced 4 chains apart, and all the metal required in this length is to be broken before the gangs move on.
 Roadside camps.
 Gangs 4 chains apart.
9. The workers are seated, as before, opposite one another, or, if space is not available, facing one way, but they must all be on the same side of the road. The metal as it is broken is carried and stacked in a continuous line for a 4½" coat on the *opposite* side of the road.
 Workers on one side of the road.
 Metal stacked on opposite side.
10. The length of the task is calculated and marked out in exactly the same way as above described; only in this case the standard template is used and the area is 3½ or 3·4 square feet.
 Task and setting out.
11. In both camps suitable arrangements must be made for a sufficient supply of rubble.
 Rubble supply.
-

TABLES FOR METAL COLLECTION.

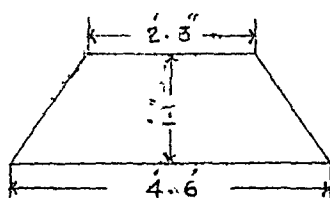
TABLE I FOR METAL COLLECTION.

GIVING LENGTH OF STACK, THICKNESS OF COAT AND CORRESPONDING QUANTITY OF COLLECTION.

Example I.

Required *quantity of collection* for a length of stack 47'-9", the thickness of coat and area of template being $4\frac{1}{2}$ " and 3.38 sft. respectively.

Quantity opposite 47 ft. length and under col. 0.75 for $4\frac{1}{2}$ " coat = 161 cft.

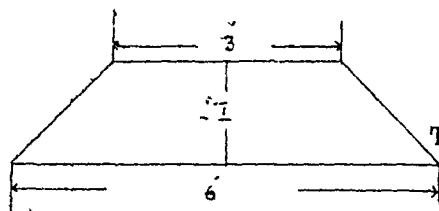


Template for $4\frac{1}{2}$ " coat of metal.

Example II.

Required *quantity of collection* for a length of stack 31'-6", the thickness of coat and area of template being 6" and 4.50 sft. respectively.

Quantity opposite 31 ft. length and under col. 0.50 for 6" coat = 142 cft.

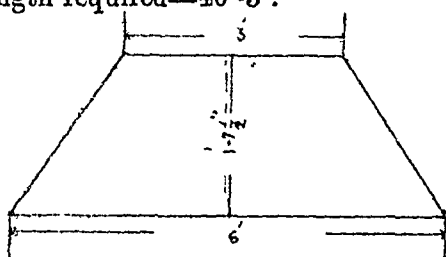


Template for 6" coat of metal.

Example III.

Required *length of stack* for a task of 272 cft., the thickness of coat and area of template being 9" and 6.75 sft. respectively.

Quantity 272 cft. will be found opposite 40 ft. length and under col. 0.25 for 9" coat. \therefore length required = 40'-3".



Template for 9" coat of metal.

TABLE I FOR METAL COLLECTION.

GIVING LENGTH OF STACK, THICKNESS OF COAT AND CORRESPONDING QUANTITY OF COLLECTION.

Length of Stack in ft.	4½ INCHES COAT: AREA 3.38 Sq. Ft.				6 INCHES COAT: AREA 4.50 Sq. Ft.				9 INCHES COAT: AREA 6.75 Sq. Ft.				Length of Stack in ft.
	0.00 ft.	0.25 ft.	0.50 ft.	0.75 ft.	0.00 ft.	0.25 ft.	0.50 ft.	0.75 ft.	0.00 ft.	0.25 ft.	0.50 ft.	0.75 ft.	
0	0	1	2	3	0	1	2	3	0	2	3	5	0
1	3	4	5	6	5	6	7	8	7	8	10	12	1
2	7	8	8	9	9	10	11	12	14	15	17	19	2
3	10	11	12	13	14	15	16	17	20	22	24	25	3
4	14	14	15	16	18	19	20	21	27	29	30	32	4
5	17	18	19	19	23	24	25	26	34	35	37	39	5
6	20	21	22	23	27	28	29	30	41	42	44	46	6
7	24	25	25	26	32	33	34	35	47	49	51	52	7
8	27	28	29	30	36	37	38	39	51	56	57	59	8
9	30	31	32	33	41	42	43	44	61	62	64	66	9
10	34	35	35	36	45	46	47	48	68	69	71	73	10
11	37	38	39	40	50	51	52	53	74	76	78	79	11
12	41	41	42	43	54	55	56	57	81	83	84	86	12
13	44	45	46	46	59	60	61	62	88	89	91	93	13
14	47	48	49	50	63	64	65	66	95	96	98	100	14
15	51	52	52	53	68	69	70	71	101	103	105	106	15
16	54	55	56	57	72	73	74	75	108	110	111	113	16
17	57	58	59	60	77	78	79	80	115	116	118	120	17
18	61	62	63	63	81	82	83	84	122	123	125	127	18
19	64	65	66	67	85	87	88	89	128	130	132	133	19
20	68	68	69	70	90	91	92	93	135	137	138	140	20
21	71	72	73	74	95	96	97	98	142	143	145	147	21
22	74	75	76	77	99	100	101	102	149	150	152	154	22
23	78	79	79	80	101	105	106	107	155	157	159	160	23
24	81	82	83	84	105	109	110	111	162	164	165	167	24
25	85	85	86	87	113	114	115	116	169	170	172	174	25
26	88	89	90	90	117	118	119	120	176	177	179	181	26
27	91	92	93	94	122	123	124	125	182	184	186	187	27
28	95	95	96	97	125	127	128	129	189	191	192	194	28
29	98	99	100	101	131	132	133	134	196	197	199	201	29
30	101	102	103	104	135	136	137	138	203	204	206	208	30

TABLE I FOR METAL COLLECTION.
GIVING LENGTH OF STACK, THICKNESS OF COAT AND CORRESPONDING
QUANTITY OF COLLECTION.—(Concl'd.)

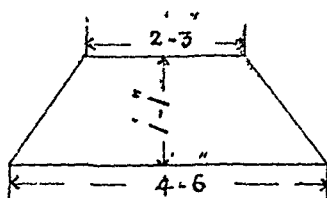
Length of Stack in ft.	4½ INCHES COAT: AREA 3·38 Sq. Ft.				6 INCHES COAT: AREA 4·50 Sq. Ft.				9 INCHES COAT: AREA 6·75 Sq. Ft.				Length of Stack in ft.
	0·00 ft.	0·25 ft.	0·50 ft.	0·75 ft.	0·00 ft.	0·25 ft.	0·50 ft.	0·75 ft.	0·00 ft.	0·25 ft.	0·50 ft.	0·75 ft.	
31	105	106	106	107	140	141	142	143	209	211	213	214	31
32	108	109	110	111	144	145	146	147	216	218	219	221	32
33	112	112	113	114	149	150	151	152	223	224	226	228	33
34	115	116	117	117	153	154	155	156	230	231	233	235	34
35	118	119	120	121	158	159	160	161	236	238	240	241	35
36	122	123	123	124	162	163	164	165	243	245	246	248	36
37	125	126	127	128	167	168	169	170	250	251	253	255	37
38	128	129	130	131	171	172	173	174	257	258	260	262	38
39	132	133	134	134	176	177	178	179	263	265	267	268	39
40	135	136	137	138	180	181	182	183	270	272	273	275	40
41	139	139	140	141	185	186	187	188	277	278	280	282	41
42	142	143	144	144	189	190	191	192	284	285	287	289	42
43	145	146	147	148	194	195	196	197	290	292	294	295	43
44	149	150	150	151	198	199	200	201	297	299	300	302	44
45	152	153	154	155	203	204	205	206	304	305	307	309	45
46	155	156	157	158	207	208	209	210	311	312	314	316	46
47	159	160	161	161	212	213	214	215	317	319	321	322	47
48	162	163	164	165	216	217	218	219	324	326	327	329	48
49	166	166	167	168	221	222	223	224	331	332	334	336	49
50	169	170	171	172	225	226	227	228	338	339	341	343	50
51	172	173	174	175	230	231	232	233	344	346	348	349	51
52	176	177	177	178	234	235	236	237	351	353	354	356	52
53	179	180	181	182	239	240	241	242	358	359	361	363	53
54	183	183	184	185	243	244	245	246	365	366	368	370	54
55	186	187	188	188	248	249	250	251	371	373	375	376	55
56	189	190	191	192	252	253	254	255	378	380	381	383	56
57	193	194	194	195	257	258	259	260	385	386	388	390	57
58	196	197	198	199	261	262	263	264	392	393	395	397	58
59	199	200	201	202	266	267	268	269	398	400	402	403	59
60	203	204	204	205	270	271	272	273	405	407	408	410	60

TABLE II FOR METAL COLLECTION.

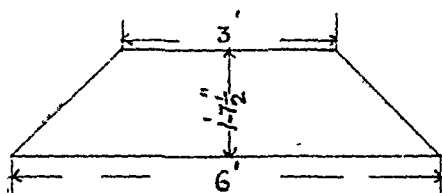
SHOWING LENGTHS OF STACKS TO CONTAIN ANY GIVEN NUMBER OF CUBIC FEET FROM 31 TO 500.

Metal.

- (a) Stack containing $3\frac{3}{8}$ cubic feet per foot run equal to a $4\frac{1}{2}$ " coat 9' wide.



- (b) Stack containing $6\frac{3}{4}$ cubic feet per foot run equal to a 9" coat 9' wide.



Moorum.

- (c) Stack containing 9 cubic feet per foot run equal to a 9" coat 12' wide.

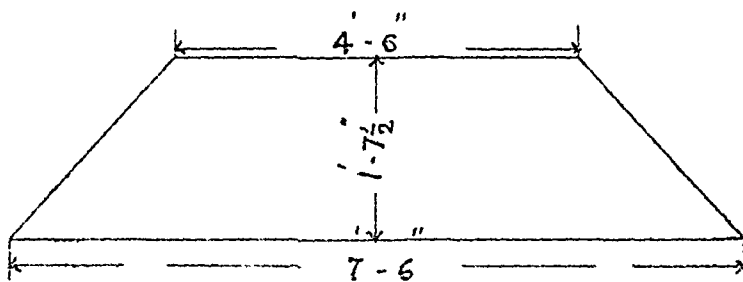


TABLE II FOR
SHOWING LENGTHS OF STACKS TO CONTAIN ANY GIVEN

Task in cubic foot.	EQUIVALENT LENGTH OF STACKS OF SECTIONS.			Task in cubic foot.	EQUIVALENT LENGTH OF STACKS OF SECTIONS.			Task in cubic foot.	EQUIVALENT Ssq (a) 3 1/2 square feet.
	(a) 3 1/2 square feet.	(b) 6 1/4 square feet.	(c) 9 square feet.		(a) 3 1/2 square feet.	(b) 6 1/4 square feet.	(c) 9 square feet.		
	Ft. In.	Ft. In.	Ft. In.		Ft. In.	Ft. In.	Ft. In.		Ft. In.
31	9 2	4 7	3 5	51	15 2	7 7	5 8	71	21 0
32	9 6	4 9	3 7	52	15 4	7 8	5 9	72	21 4
33	9 10	4 11	3 8	53	15 6	7 9	5 11	73	21 8
34	10 0	5 0	3 9	54	16 0	8 0	6 0	74	21 10
35	10 6	5 3	3 11	55	16 4	8 2	6 1	75	22 0
36	10 10	5 5	4 0	56	16 8	8 4	6 3	76	22 4
37	11 2	5 7	4 1	57	17 0	8 6	6 4	77	22 8
38	11 6	5 9	4 3	58	17 2	8 7	6 5	78	23 0
39	11 8	5 10	4 4	59	17 6	8 9	6 7	79	23 4
40	11 10	5 11	4 5	60	17 8	8 10	6 8	80	23 8
41	12 0	6 0	4 7	61	18 0	9 0	6 9	81	23 10
42	12 4	6 2	4 8	62	18 4	9 2	6 11	82	24 0
43	12 8	6 4	4 9	63	18 8	9 4	7 0	83	24 4
44	13 0	6 6	4 11	64	19 0	9 6	7 1	84	24 8
45	13 2	6 7	5 0	65	19 4	9 8	7 3	85	25 0
46	13 6	6 9	5 1	66	19 8	9 10	7 4	86	25 4
47	13 10	6 11	5 3	67	19 10	9 11	7 5	87	25 8
48	14 2	7 1	5 4	68	20 0	10 0	7 7	88	26 0
49	14 6	7 3	5 5	69	20 4	10 2	7 8	89	26 4
50	14 10	7 5	5 7	70	20 8	10 4	7 9	90	26 6

METAL COLLECTION.

NUMBER OF CUBIC FEET FROM 31 TO 500.

LENGTH OF STACKS OF TIONS.		Task in cubic feet.	EQUIVALENT LENGTH OF STACKS OF SECTIONS.			Task in cubic feet.	EQUIVALENT LENGTH OF STACKS OF SECTIONS.		
(b) 6 1/4 square feet.	(c) 9 square feet.		(a) 3 1/8 square feet.	(b) 6 1/4 square feet.	(c) 9 square feet.		(a) 3 1/8 square feet.	(b) 6 1/4 square feet.	(c) 9 square feet.
Ft. In.	Ft. In.		Ft. In.	Ft. In.	Ft. In.		Ft. In.	Ft. In.	Ft. In.
10 6	7 11	91	26 10	13 5	10 1	111	32 10	16 5	12 4
10 8	8 0	92	27 2	13 7	10 3	112	33 0	16 6	12 5
10 10	8 1	93	27 6	13 9	10 4	113	33 4	16 8	12 7
10 11	8 3	94	27 10	13 11	10 5	114	33 8	16 10	12 8
11 0	8 4	95	28 2	14 1	10 7	115	34 0	17 0	12 9
11 2	8 5	96	28 6	14 3	10 8	116	34 4	17 2	12 11
11 4	8 7	97	28 8	14 4	10 9	117	34 8	17 4	13 0
11 6	8 8	98	28 10	14 5	10 11	118	35 0	17 6	13 1
11 8	8 9	99	29 4	14 8	11 0	119	35 2	17 7	13 3
11 10	8 11	100	29 8	14 10	11 1	120	35 4	17 8	13 4
11 11	9 0	101	30 0	15 0	11 3	121	35 8	17 10	13 5
12 0	9 1	102	30 4	15 2	11 4	122	36 0	18 0	13 7
12 2	9 3	103	30 8	15 4	11 5	123	36 4	18 2	13 8
12 4	9 4	104	31 0	15 6	11 7	124	36 8	18 4	13 9
12 6	9 5	105	31 4	15 8	11 8	125	37 0	18 6	13 11
12 8	9 7	106	31 8	15 10	11 9	126	37 4	18 8	14 0
12 10	9 8	107	31 10	15 11	11 11	127	37 8	18 10	14 1
13 0	9 9	108	32 0	16 0	12 0	128	38 0	19 0	14 3
13 2	9 11	109	32 4	16 2	12 1	129	38 2	19 1	14 4
13 3	10 0	110	32 6	16 3	12 3	130	38 6	19 3	14 5
						200	59 4	29 8	22 2
						300	89 0	44 6	33 3
						400	118 8	59 4	44 4
						500	148 4	74 2	55 5

TABLES FOR METAL COLLECTION.

In the Tables recently issued the equivalent lengths for any given task in cubic feet were given for stacks of $3\frac{3}{4}$, $6\frac{3}{4}$ and 9 square feet section. Those for stacks of 20 square feet section mentioned in Appendix VIII of General Order $\frac{287}{7830}$, of 20th September 1899, were not given, as the division of the task by 20 was considered so simple an operation as not to require a special Table.

Some difficulty, however, appears to be experienced by Work Agents and others in ascertaining the length of stack of 20 square feet section corresponding to the remainder after division of the task in cubic feet by 20. The Table given below will be of use. It should be pasted into their Measurement Books by Work Agents:—

TASK.	EQUIVALENT LENGTH OF A STACK OF 20 SQUARE FEET SECTION.	
	Cubic Feet.	In Inches.
1	·05'	$\frac{3}{4}$ "
2	·10'	$1\frac{1}{4}$ "
3	·15'	2"
4	·20'	$2\frac{1}{2}$ "
5	·25'	3"
6	·30'	$3\frac{1}{2}$ "
7	·35'	4"
8	·40'	$4\frac{1}{2}$ "
9	·45'	$5\frac{1}{4}$ "
10	·50'	6"
11	·55'	$6\frac{3}{4}$ "
12	·60'	$7\frac{1}{2}$ "
13	·65'	8"
14	·70'	$8\frac{1}{2}$ "
15	·75'	9"
16	·80'	$9\frac{1}{2}$ "
17	·85'	$10\frac{1}{4}$ "
18	·90'	11"
19	·95'	$11\frac{1}{2}$ "

Example.—The Task for a gang is 97 cubic feet. Required length of stack of 20 square feet section $\frac{97}{20} = 4$ and 17 over $= 4' \cdot 10\frac{1}{4}"$.

L. M. ST. CLAIR,

Executive Engineer,

Nagpur Division.

NAGPUR:

The 12th March 1900.

APPENDIX IX.

Directions for treatment of Wells with permanganate of potassium as a means of checking epidemics of cholera, by E. H. Hankin, Esq., Chemical Examiner and Bacteriologist, North-Western Provinces and Oudh.

Permanganate of potassium is a crystalline salt-like substance, of a purple colour, in whose preparation only mineral substances are employed. Hence its use in wells need not be objected to by the strictest Hindu.

Put one or two ounces of the solid substance into a *dol* or bucket that has been filled with water drawn from the well about to be treated. Stir it up, and pour the red solution thus produced into the well, leaving the portion of permanganate that is not yet dissolved at the bottom of the *dol*. Lower the *dol* into the well, fill it with water, draw it up, pour back the water as before. Repeat the process till all the permanganate has been dissolved. After half-an-hour draw up some of the water and examine it. If a red colour is still present, enough has been added. If the red colour has disappeared then more permanganate should be added to the water in the well. In all cases enough permanganate should be added to produce a faint red colour lasting for 24 hours.

If the water in the well is bad, more permanganate will be necessary. In such a case it will be found that the strong red colour at first produced quickly changes to brown and then fades away. This is because the permanganate destroys dirt and is destroyed by it. Therefore if the water in the well is clean, a smaller quantity of permanganate will be necessary. From one to four ounces of permanganate will be found to be enough for ordinary wells. If more permanganate is added than is enough to produce a faint permanent red colour, it is likely that frogs that may be in the well will be killed. This will in a few days give the water a putrid taste. If the quantity of permanganate is not enough to produce a faint permanent red colour, it is not likely to do any good. If possible, the permanganate should be added at night in order to leave the wells undisturbed as long as possible. The water will be fit to drink on the following morning. If on the following morning a red colour is still present, the water may have an unpleasant taste, but it is perfectly harmless. If the inhabitants do not like the taste, they should be instructed to pump out the water until the colour vanishes. Always care should be taken to treat with permanganate all the wells in the place, not only those used for drinking, but also those used for washing purposes. Care should be taken to explain to the inhabitants the reason of using permanganate, and they should be warned against using water from other sources that have not been treated. If one well is required for immediate use, perhaps it would be advisable to add to it a quantity of permanganate and to employ *bhishtis* to draw out the water until the colour has disappeared, but this well should again be treated with permanganate on the following day when the other treated wells are brought into use.

Usually water is kept stored in the houses for washing or other purposes in *gharas*, &c. This should be poured away and, if possible, the inhabitants should be persuaded to wash out their *lotas* and other vessels with water containing permanganate. Unless this is done, isolated cases of cholera are likely to occur even four or five days after the treatment of the wells. I have had experience of a case in which a woman was attacked with cholera after treatment of wells, because she was frightened of touching the red water in the well, and drank water that had been stored in the house and that had been taken from the well before the addition of the permanganate.

Simple methods of sterilizing water and storing it for drinking purposes.

In reply to your No. 4—229, dated the 8th instant, I have the honour to state that I consider boiling the simplest and most reliable method of sterilizing water for drinking purposes, and the addition of about 6 grains of alum to the gallon the readiest means of precipitating suspended matter. To carry out these measures effectively, the alum should be added in the morning and the cleared water drawn off and heated in the evening, being kept at boiling point for at least ten minutes. After cooling down during the night, it is ready for issue the following morning. The best method of storing it is in locked galvanized iron drums provided with taps, and it should be carried to the fields in kerosine tins.

2. When boiling is impracticable, Condyl's fluid should be added until the water acquires a permanently slight pink tint.

APPENDIX X.

Form of Appointment of a member of the Work Establishment.

(To be prepared and signed in triplicate, one copy to be given to the person appointed, one copy to be transmitted to the Examiner, Public Works Accounts, and one copy to be recorded in the office of the authority making the appointment.)

FROM

THE DIVISIONAL ENGINEER,

Public Works Department,

To

No. _____

Dated at _____, the _____ of _____ 19 .

Under sanction conveyed in _____ you are hereby appointed a member of the Work Establishment of the _____ Division, Public Works Department, in the Central Provinces, as a _____ on a consolidated salary of Rupees (_____) per month with effect from the morning of the day you enter upon your duties under the District Sub-Divisional Officer of _____ to whom you should report yourself without delay.

2. Your appointment will cease on receipt of a written notice from the District Sub-Divisional Officer. If he considers your conduct and work have been satisfactory, he is empowered to then pay you a sum equivalent to your salary for ten to fourteen days in lieu of travelling allowance to enable you to return home. This cannot be claimed as a right.

3. You are liable to summary dismissal at any time without notice for serious misconduct or incompetence proved to the satisfaction of the District Sub-Divisional Officer.

4. Should it be desirable to retain your services after the cessation of the work or works on which you were engaged, you will be placed in charge of such works by the District Sub-Divisional Officer.

5. While in Government employ you will be subject to and governed by the Rules for the time being in force in the Public Works Department, supplemented by such other orders as you may from time to time receive from the officer under whom you are serving.

6. Your salary is consolidated and includes all charges, and you will not be entitled to any travelling or other allowances.

7. This appointment is cancelled should you fail to join by _____

Divisional Engineer.

(Declaration by person appointed.)

I hereby accept the appointment conferred on me in the above order, the terms of which I clearly understand and agree to; and I hereby bind myself to observe and abide by the Rules referred to in paragraph 5 of the said order.

(Signature) _____

Dated at _____, the _____

APPENDIX XI-a.

FIELD ACCOUNTS FORM No. I (*Back*).

Gang No. 13. Mate—Bhola.

Nature of work— Earthwork.

Full strength as made up on 10th December 1899

g in.

e has the neces-
e will form them
guishing number,
of the work they
gang to a Gang
n.

pply to the Tools
ang. The Tools
n of the gang and
oon, and will then
e number of each
esponsible for the
t.

E.

as filled up in the
a gang consisting
mediate or Task-

ts of from 20 to 30
nts, if any, being
being employed in
working on the

tries below *Total*
h the exception of
entries are made
at the full rate of
that the gang will

tem the gang is
lects its own head-
may be due to the
bution. Individual

Class.	<i>Workers.</i>		No.
Special	...	...	...
I	{ Men	...	...
	{ Women	...	...
II	{ Men	...	...
	{ Women	...	...
III	Working children	...	...
<i>Dependants.</i>			
IV	Adults	...	...
V	{ (a) Children over 8	...	...
	{ (b) Do. under 8	...	...

KESHEO RAO,

Gang Muharrir.

<i>Tools.</i>			No.
Pickaxes	...	...	8
Phouras	...	...	4
Crowbars	...	...	...
Sledge hammers	...	...	...
Hand do.	...	...	...
Baskets	...	...	20
Bamboos and flags	...	...	8
Pegs	...	...	10
Templates, large	...	...	...
Do., small	...	...	...
Mates' badges	...	...	...

YESHWANT RAO,

Tools Muharrir.

Work on which employed—Earthwork.

System—(a) Intermediate

[illegible]

APPENDIX XI-b.

FIELD ACCOUNTS FORM NO. I (*Back*).

Gang No. 2. Mate—Bhapoo

Nature of work—Metal-breaking

Full strength as made up on 10th December 1899.

ing in.

large has the neces-
e, he will form them
a distinguishing
on the nature of
yed on, and allot
lling in the form as

to go to the Tools
gang. The Tools
osition of the gang
mployed upon, and
ools, entering the
The Mate is then
he tools shown in

K.

s filled up in the
for a gang of 85
r Task-work.

Gratuitous as a
It must be under-
e no entries under
at the breast: all
hildren, with the
n the kitchen and

Workers.

	Class.		No
	Special	...	1
I	{ Men	...	20
	{ Women	...	...
II	{ Men	...	5
	{ Women	...	35
	III Working children	...	15

Dependants.

		On works.	In kitchen.
IV Adults	...	...	7
V	{ Children over 8	...	2
	{ Do. under 8	...	13

KESHEO RAO,

Gang Muharrir.

Tools.

Pickaxes	...	...	6
Phouras	...	...	...
Crowbars	...	...	2
Sledge hammers	...	...	60
Hand hammers	...	...	20
Baskets	...	...	8
Bamboos and flags	...	...	10
Pegs	...	...	...
Templates, large	...	...	...
Do., small	...	...	2
Mates' badges	...	...	1

YESHWANT RAO,

Tools Muharrir.

Gang No. .
Mate—Bl. .

Work on which employed—Metal-breaking.
System—(b) Task-work.

		THURSDAY, 14th December.					FRIDAY, 15th December.					SATURDAY, 16th December.				
Class.	Amount.	NUMBER.				Amount.	NUMBER.				Amount.	NUMBER.				Amount.
		Men.	Women.	Children.	Total.		Men.	Women.	Children.	Total.		Men.	Women.	Children.	Total.	
WORKING.	s. a. p.					Rs. a. p.					Rs. a. p.					Rs. a. p.
	Sp ^l 0 2 6	1	...	...	1	0 2 6	1	...	...	1	0 2 6	1	...	...	1	0 2 6
	2 8 0	19	...	...	19	2 6 0	19	...	...	19	2 6 0	19	...	...	19	2 6 0
	3 12 0	5	34	...	39	3 10 6	5	34	...	39	3 10 6	5	34	...	39	3 10 6
	10 11 3	...	...	14	14	0 10 6	...	...	14	14	0 10 6	...	...	14	14	0 10 6
	7 1 9	25	34	14	73	6 13 6	25	34	14	73	6 13 6	25	34	14	73	6 13 6
GRATUITOUS.	0 8 9	7				0 8 9	7				0 8 9	7				0 8 9
	0 1 0	1				0 0 6	1				0 0 6	1				0 0 6
	0 9 9	8				0 9 3	8				0 9 3	8				0 9 3
	7 11 6	81				7 6 9	81				7 6 9	81				7 6 9
Fines & Clas	...	...				...	...				...	...				...
Amount	...	..				...	...				...	..				...
Signatur																
Task—																
Due per		202½ cft.					202½ cft.					202½ cft.				
" "																
Task p																
Deficie																
Signat																

W

AMENDED.

Table showing the wages due

Full wages in pice.	WAGES FOR SH		
	PROPORTION OF W		
	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$
4	1	1	1
5	1	1	2
6	1	1	2
7	1	2	3
8	1	2	3
9	1	2	3
10	1	2	4
11	1	3	4
12	1	3	4
13	1	3	5
14	2	3	5
15	2	4	6
16	2	4	6
17	2	4	6

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urement
427 cft.
task set,
he wages
marginal
Mate for

APPENDIX XI-c.

FIELD ACCOUNTS FORM NO. I (Back).

Gang No. 13. Mate—Bhola.

Nature of work—Earthwork.

Full strength as made up on 10th December 1899.

Workers.

Class.	No.
Special	1
I. { (a) Quarrymen, &c.	7
(b) Gang Mates	...
II. { Men	3
Women	10
III. Working children	6

Dependants.

	On works.	In kitchen.
IV. Adults	...	1
V. { (a) Children over 8	...	1
(b) Do. under 8	...	3

KESHAO RAO,

Gang Muharrir

Tools.

	No.
Pickaxes	8
Phouras	4
Crowbars	...
Sledge hammers	...
Hand hammers	...
Baskets	20
Bamboos and flag	8
Pegs	10
Templates, large	...
Do., small	...
Mates' Badges	1

YESHWANT RAO,

Tools Muharrir.

ing in.

APPENDIX XI-d.

ge has the neces-
he will form them
tinguishing number,
ature of the work
allot the gang to a
as shown.

to go to the Tools
gang. The Tools
sition of the gang
mployed upon, and
tools, entering the
The Mate is then
he tools shown in

K.

ly filled up for a
Task-work. Under
may be imposed in

s may be paid at

work diggers may
in rate;

s may be paid at

2) and (3) above
more than twice a
ction of the Famine
at;

perintendent may,
work, fine diggers
a pice below the
that no worker
to or below the
three times a week;

to resist authority
to the Divisional
ith by him specially;

posed on children
orkers.

te paid digger's
arrier's wage, and
mum wage.

ork—Mate gets 2
minimum wage and
are both reduced
ge.

carriers has already
vice this week and
ed oftener without
rom the Executive
efore reduce mate
ge and diggers to
uly.

FIELD ACCOUNTS FORM No. I (*Back*).

Gang No. 2. Mate—Bhapoo.

Nature of work—Metal-breaking.

Full strength as made up on 10th December 1899.

		<i>Workers.</i>	
Class.			No.
Special	..	...	1
I {	Men	...	20
	Women	...	...
II {	Men	...	5
	Women	...	35
III	Working children	...	15

		<i>Dependants.</i>	
		On works.	In kitchen.
IV	Adults	...	7
V {	Children over 8	...	2
	Do. under 8	...	13

KESHEO RAO,

Gang Muharrir.

		<i>Tools.</i>	
			No.
	Pickaxes...	...	...
	Phouras ...	...	6
	Crowbars	...	...
	Sledge hammers	...	2
	Hand hammers	...	60
	Baskets ...	...	20
	Bamboos and flags	...	8
	Pegs ...	...	10
	Templates, large	...	...
	Do., small	...	2
	Mates' badges	...	1

YESHWANT RAO,

Tools Muharrir.

Gang

Work on which employed—Metal-breaking.

Mate-
ee.

System—(b) Task-work.

SDAY. ember.		THURSDAY. 14th December.				FRIDAY. 15th December.				SATURDAY. 16th December.						
Clas	Amount.	NUMBER.				Amount.	NUMBER.				Amount.	NUMBER.				
		Men.	Women.	Children.	Total.		Men.	Women.	Children.	Total.		Men.	Women.	Children.	Total.	
WORKERS.	Rs. a. p. 0 2 6	1	...	...	1	Rs. a. p. 0 2 6	1	...	...	1	Rs. a. p. 0 2 6	1	...	...	1	Rs. a. p. 0 2 6.
	2 8 0	19	...	...	19	2 6 0	19	...	...	19	2 6 0	19	...	...	19	2 6 0
	3 12 0	5	34	...	39	3 10 6	5	34	...	39	3 10 6	5	34	...	39	3 10 6
	0 11 3	.	...	14	14	0 10 6	...	...	14	14	0 10 6	...	...	14	14	0 10 6
	7 1 9	25	34	14	73	6 13 6	25	34	14	73	6 13 6	25	34	14	73	6 13 6
GRATUITOUS.	0 8 9	7				0 8 9	7				0 8 9	7				0 8 9
	0 1 0	1				0 0 6	1				0 0 6	1				0 0 6
	0 9 9	8				0 9 3	8				0 9 3	8				0 9 3
Fines— II or	7 11 6	81				7 6 9	81				7 6 9	81				7 6 9
	(c) 0 10 6	20				(c) 0 10 0	...				Nil.	...				Nil.
Amount	7 1 0	...				6 12 9	...				7 6 9	...				7 6 9
Signatu-al.	Kanya Lal.				Kanya Lal.				Kanya Lal.							
Task—l	Cft.				Cft.				Cft.							
Du	202½				202½				202½							
Task p	180				200				204							
Deficie	...				...				...
Signat Bux.	Hussein Bux.				Hussein Bux.				Hussein Bux.							

APPENDIX XII.

APPENDIX A.IV.

SAMPLE OF
OFFICER-IN-CHARGE'S CASH BOOK.

(P. W. D. FORM NO. 3.)

Note.—All connected with Kitchens is classed under *Gratuitous*, except the pay of monthly employés, such as the Hospital Assistant and Kitchen Muharrir; these fall under *Work establishment*

The Officer-in-charge will only have three kinds of vouchers to submit in support of the charges in his Cash Book, *vis.* :—

- (1) Officer-in-charge's Day Book (Field Accounts Form No. III).
- (2) Acquittance Rolls (P. W. D. Form No. 23).
- (3) Hand Receipts (P. W. D. Form No. 16).

In the example—

Vouchers Nos. 1, 8, 11, 12, 15, 16 and 20 are the Day-Books of the Officer-in-charge (Field Accounts Form No. III).

Vouchers Nos. 2, 3, 4 and 10 are paid Acquittance Rolls (P. W. D. Form No. 23).

Vouchers Nos. 5, 9, 13, and 14 are Hand Receipt Forms (P. W. D. Form No. 16) with the description of supplies and amounts paid entered thereon and receipted by the Vendor. To these receipts the detailed bills of Vendors are attached.

Vouchers Nos. 6, 7, 17, 18 and 19 are Hand Receipt Forms (P. W. D. Form No. 16) without any supporting details other than those entered on the form itself.

APPENDIX XIV.

P. W. D. FORM NO. 3.

Imprest Cash Book of Waman Rao, Officer-in-charge, Katol-Kalmeshwar Road, Charge No. 1.

30

Day of the month.	Voucher No.	Transactions.	Amount of each payment.			Total.			
1	2	3	4			5			6
			Rs.	a.	p.	Rs.	a.	p.	
		Balance ...				720	2	6	
December 10th.	1	Paid Gang Registers of 10th— Wages ...	174	3	9				Wages.
		Gratuitous ...	6	9	3				Gratuitous.
Do. do.	2, 3 & 4	Paid Work Establishment wages for November ...	324	14	3				Work Estab- lishment.
Do. 11th.		Received cash from Treasury ...				2,000	0	0	
						2,720	2	6	
Do. do.	5	Paid Hera Mull, Bania, for stores for kitchen ...	42	0	0				Gratuitous.
Do. do.	6	Paid sweepers for burying two cholera corpses ...	1	0	0				Other items.
Do. do.	7	Paid for firewood for burning three other corpses ...	2	0	0				Do.
Do. do.	8	Paid Gang Registers of 11th— Wages ...	190	15	3				Wages.
		Gratuitous ...	6	9	3				Gratuitous.
Do. 12th.	9	Paid Laxman Patel for grass and bullics for kitchen sheds ...	14	2	6				Do.
Do. do.	10	Paid T. Narainswamy, Hospital Assistant's allowances for November ...	23	12	0				Work Estab- lishment.
Do. do.	11	Paid Gang Registers of 12th— Wages ...	192	1	3				Wages.
		Gratuitous ...	6	9	3				Gratuitous.
Do. 13th.	12	Paid Gang Registers of 13th— Wages ...	196	14	0				Wages.
		Gratuitous ...	6	9	3				Gratuitous.
Do. 14th.	13	Paid Chabildas, Bania, for stores for kitchen ...	167	10	7				Do.
Do. do.	14	Paid for chuppers and mats for cholera sheds ...	12	0	0				Other items.
Do. do.	15	Paid Gang Registers for 14th— Wages ...	215	15	6				Wages.
		Gratuitous ...	6	9	9				Gratuitous.
Do. 15th.	16	Paid Gang Registers for 15th— Wages ...	238	5	3				Wages.
		Gratuitous ...	6	10	9				Gratuitous.
		Carried over ...	1,835	7	10	2,720	2	6	

P. W. D. FORM NO. 3.

31

Imprest Cash Book of

Day of the month	Voucher No	Transactions.	Amount of each payment.			Total.			
1	2	3	4			5			6
			Rs.	a.	p.	Rs.	a.	p.	
		Brought forward ...	1,835	7	10	2,720	2	6	
December 16th.	17	Paid Heera, Kitchen Warder's wages, 1st to 15th.	2	1	9				Gratuitous.
Do. ...	18	Paid Muttroo, Assistant Warder's wages, 8th to 15th.	0	14	3				Do.
Do. ...	19	Paid for nands for Piaoos ...	2	1	9				Other items.
Do. ...	20	Paid Gang Registers for 16th—Wages.	241	10	3				Wages.
		Gratuitous ...	6	10	9				Gratuitous.
						2,088	14	7	
		Balance ...	...	...	...	631	3	11	

Dated the 16th December 1899.

WAMAN RAO, Officer-in-charge

FAMINE RELIEF—NAGPUR DISTRICT.
Charge No 1—Katol-Kalmeshwar Road.
Period—10th to 16th December 1899.

A vertical strip of a spiral-bound notebook. The notebook is oriented vertically, showing the binding on the left side. The pages are lined with horizontal lines. The spiral binding is visible on the left edge. The notebook is placed against a dark background.

49

P. W. D. FORM NO. 16.

Block.

Payee—Tikaram.

Name of work—Famine Relief-work No. 1, Nagpur.

Date of present payment—16th December 1899.

Voucher No. 19.

Value of work or supplies to date of latest measurements ... Rs.

Payments previously made ... Rs.

Payment now made ... Rs. 2 1 9

Distribution of payments and quantities by sub-heads, or other necessary particulars.

Other items.

Initials of Officer making the payments. } W. R.

Cash-Book Voucher No. 19.

49

P. W. D. FORM NO. 16.

Hand Receipt Form.

(To be used indifferently for payments for work, materials, or other services.)

NAGPUR DIVISION:

Charge No. 1, Kalmeshwar Road,

December 16th 1899.

Voucher No. 19.

Received from the Officer-in-Charge

in charge of Katol-Kalmeshwar Famine Relief-work, Charge No. 1,

the sum of Rupees two anna one and pies nine only.

Name of work or purpose for which payment ^{made} Supplying six big nands and four ghurras.

Witnesses: { T. Narainswamy, Hospital Assistant.

{ Ram Singh, Muharrir.

x Tikaram (his mark).

The 16th December 1899.

If the person receiving money signs in the vernacular, he should also enter in the vernacular the amount received and his place of residence, his name being noted in English on the voucher. If unable to write, his mark or seal to the above entries should be attested by two competent witnesses, in whose presence the nature of the payment should be fully explained.

*The disburser will initial the remark applicable to the case.

P. W. D. FORM No. 16.

	Rs.	a.	p.	} (To be filled in when the payment is made for work done or supplies received.)
Total value of work done or materials supplied up to date of last measurement or inspection.				
	Rs.	a.	p.	
Previous payments made ...				
Payment now made _____				
	BALANCE	...		

Vide

Signature of } _____

Payee }

Notes.—This form should be used in the following cases:—

- For "payments on account" for work or supplies, as an alternative to contract certificate Form No. 14.
- When payment is made as an advance or any other miscellaneous account.
- When payment is made in this form for work, the accounts of which are kept in the Divisional Office by sub-heads, the Sub-divisional Officer must, unless he prepares the work abstract, distribute the quantities and payments by sub-heads. In such cases it will probably be more convenient to use Form No. 14.

79664

Acquittance Roll for the month of December 189 .

Cash Book Voucher No. 10.

Name.	Class and Grade.	Amount of allowance* for November.		Amount of income-tax imposed.		Net amount paid.		NOTE OF DEDUCTIONS OF SUBSCRIPTIONS TO SERVICE FUNDS, &c.			Signature † and Stamp for each payment exceeding Rs. 20					
		a.	p.	a.	p.	a.	p.	Particulars.	Amount.							
T. Narainswamy ..	Hospital Assistant...	Rs.	23	12	0	Rs.	23	12	0	.....	Rs.	...	a.	...	p.	...
TOTAL ..		Rs.	23	12	0		23	12	0	.....		...		...		...

Amounts payable only.

three and twenty.

Paid by cash † Rupees

Paid by cheque †

Paid by me † W. RAO.

Paid in my presence †

* Salaries and travelling allowances should not be mixed up : a separate Acquittance Roll should always be prepared for each when paid separately.
† Against each signature the date of payment should be entered when the payment is made and acknowledged.
‡ The disburser will initial the remark applicable to the case.

Dated the 15th December 189 :

Accountant.

T. SMITH,

Sub-Engineer.

NOTES.

Reference to P. W. D. Code.

Chapter XIII, para. 97.

DIVISION—

MONTH—

VOUCHER NO.

1. The Acquittance Roll shows against each person's name either the salary or travelling allowance paid to him. The totals of the columns "Salaries" or "Travelling allowances" should be the amounts paid during the month. Persons absent, or otherwise unable to sign the regular Acquittance Roll, must furnish separate receipts, which will be annexed to the Acquittance Roll.

Acquittance Roll.

Weekly Report for period ending Saturday the _____

1. Physical condition of (A) those applying for admission $\left\{ \begin{array}{l} (a) \text{ Fairly healthy} \\ (b) \text{ Weakly.} \\ (c) \text{ Emaciated.} \end{array} \right.$ _____

Do. of (B) Relief workers generally $\frac{\text{Good}}{\text{Not good}}$ _____

2. Applicants for relief are $\frac{\text{still coming in.}}{\text{not coming in}}$ _____

3. The number of deaths occurring on the work during the week and or abnormal sickness. _____

4. Efficiency of food and water-supply arrangements. Grain used as in seers per rupee. _____

5. Sufficiency of staff and organization of gangs. _____

6. $\frac{\text{Difficulty}}{\text{No difficulty}}$ is found in providing work for all applicants. At the _____

remains for _____ weeks.

7. Succinct notes on work and anything that should be brought to notice _____

WAGES PAID ON OTHER ITEMS.

WAGES PAID TO INTERMEDIATE GANGS.

DATED AT

The

190 . }

1. The
same either
The totals
ances" sh
Persons :
Acquittar
de annex

EARTHWORK IN EXCAVATION (SOFT MOORING). LEAD 500 FT.	METAL- BREAKING. Task, Class I—100 cft.	MOORING AND STAGING. Task, Class I—4½ cft. Class II—3 cft.	Wages paid to task or weekly gangs.	Hutting.	Conservancy.	Water- supply.	Gratuitous relief.	Works estab- lishment.	Other items.	Grand Total.	REMARKS.
ok...	Rs 757	529	171	...	11	33	46	100	36	1,784	
side column 11)	Rs 757	529	171	...	...	...	...	...	...	...
mn 34)	Cft. 114,300	15,243	4,689	...	...	...	...	...	...	...
...	Rs. 0 10 7	3 7 6	3 10 4	...	...	...	...	...	...	...
...	Rs. 0 12 0	3 10 0	1 2 0	...	...	...	...	...	...	...
column 33)	...	...	...	...	...	...	...	...	...	19,956	No.
week added together)	...	...	...	...	...	...	...	...	...	1,648	Rs.
...	...	...	...	...	...	...	...	...	...	528	Pice.
...	Cft. 237,800	39,746	10,780	...	...	...	...	...	...	...
in day-units	...	...	...	...	...	...	...	...	...	185,762	Day-units.

APPENDIX XVI.

FAMINE RELIEF WORKS, CENTRAL PROVINCES.

FIELD ACCOUNTS FORM No. V.

Harsud Sub-Division, Harsud. Head-quarters, Nimar District.

Corporal W. BROWN, Sub-Divisional Officer. Captain H. AINSLIE, Famine Works Superintendent.

Note for the information of the Secretary to Chief Commissioner, Central Provinces,
Public Works Department.

(To be posted weekly direct to the Secretary to the Chief Commissioner, Central Provinces,
Public Works Department, commencing with the week ending Saturday,
190 .)

Despatched on Monday or Tuesday the _____ of _____

Number. The number of persons employed on Famine Relief Works for the week ending Saturday, the _____ of _____ has an average of _____ (approximate) daily.

The numbers on Saturday were—

Approximate Expenditure. The approximate expenditure on Famine Relief Works for the week has been Rs. _____

Increase or decrease. Persons are $\frac{\text{still coming in.}}{\text{not coming in}}$

Condition. Physical condition of—
(a) Those applying for admission. { (a) Fairly healthy
(b) Weakly.
(c) Emaciated.
(b) Relief Workers generally $\frac{\text{good}}{\text{not good}}$

Ordinary Works The approximate number of persons on ordinary works (give name) and the payments made by me (or bills issued) amount to Rs. _____

Prices of food. The price of common grain (*viz.*, _____) is _____ seers per Rupee.

Supplies are $\frac{\text{Sufficient}}{\text{Insufficient}}$

AVERAGE DAILY NUMBER DURING WEEK.				Total all classes on Saturday.	Expendi- ture during Week.	The following works have been started :—
Intermediate.	Task work.	Gratuitous	Total.			
1,865	3,598	1,516	6,479	6,372	Rs. 2,950	1. Asapur :—Harsud-Saria- pani Road construc- tion. Earthwork and metal collection.
2,569	766	1,092	4,427	4,258	1,822	2. Kalimachak :—Widen- ing line and breaking ballast for G. I. P. Railway.
2,682	1,979	967	5,628	5,330	3,150	3. Tawa. Do.
						4.
						5.
						6.
6,616	6,343	3,575	16,534	15,960	7,922	The following works have been visited by me :—
* Totals for the week.						1.
46,312	44,401	25,025	115,738			2.

3.

4.

5.

6.

Difficulty
No difficulty
is found in providing work
for all applicants. At the
present rate of progress,
work remains for _____
weeks.

• To be shown in red ink.

Sub-Divisional Officer.

GENERAL REMARKS

APPENDIX XVII.

FAMINE RELIEF WORKS, CENTRAL
PROVINCES.

FIELD ACCOUNTS FORM NO. VI.

For four weeks ending Saturday

the

Charge No.

District.

Division.

No. dated the

Forwarded to the Sub-Divisional Officer,

Sub-Division.

Officer-in-Charge.

No. dated

Forwarded to the Executive Engineer,

Division.

Sub-Divisional Officer.

Sub-Division.

FIELD ACCOUNTS FORM NO. VI.

8. Expenditure 4 weeks

Rs. 1/-

9. Famine Rate per % cft.

Ref.

10. Quantity of work done up to week ending

cft.

11. Total quantity to date

cft.

12. Normal rate per % cf.

Rs

13. Value of work done to date at Normal rate

Rs.

14. Total expenditure to date

Rg

5T 15T

III

APPENDIX XVIII.
FAMINE RELIEF WORKS, CENTRAL PROVINCES.

KITCHEN ATTENDANCE REGISTER.

For the week ending Saturday, the 16th December 1899.

Date.		NUMBER OF DEPENDANTS FED, WHO WERE NOT GIVEN MONEY DOLE: CLASS (a).				NUMBER OF NEW ARRIVALS FED, AND OTHER SPECIAL CASES: CLASS (b).				Total (a) and (b).
		Adults over 14 years.	CHILDREN.		Total.	Adults over 14 years.	CHILDREN.		Total.	
			8 to 14 years.	Under 8 years.			8 to 14 years.	Under 8 years.		
		No.	No.	No.	No.	No.	No.	No.	No.	No.
December 10th ...	{ Non-workers ...	44	34	288	366	27	2	9	38	404
	{ Workers ...	...	...	...	...	20	1	...	21	21
	Total ...	44	34	288	366	47	3	9	59	425
Do. 11th ...	{ Non-workers ...	47	34	268	349	24	2	17	43	393
	{ Workers ...	...	...	...	...	10	1	...	11	11
	Total ...	47	34	268	349	34	3	17	54	403
Do. 12th ...	{ Non-workers ...	47	34	270	351	24	3	37	64	415
	{ Workers ...	...	...	...	...	8	2	...	10	10
	Total ...	47	34	270	351	32	5	37	74	425
Do. 13th ...	{ Non-workers ...	47	35	270	352	4	3	42	49	401
	{ Workers ...	...	...	...	...	2	1	...	3	3
	Total ...	47	35	270	352	6	4	42	52	404
Do. 14th ...	{ Non-workers ...	46	35	271	352	...	...	51	51	403
	{ Workers ...	...	...	...	...	...	...	...	...	...
	Total ...	46	35	271	352	...	...	51	51	403
Do. 15th ...	{ Non-workers ...	46	33	271	350	...	...	51	51	401
	{ Workers ...	...	...	...	...	...	...	...	...	...
	Total ...	46	33	271	350	...	...	51	51	401
Do. 16th ...	{ Non-workers ...	46	33	271	350	3	...	51	54	404
	{ Workers ...	...	...	...	...	1	...	...	1	1
	Total ...	46	33	271	350	4	...	51	55	405
Total	{ Non-workers ...	323	238	1,889	2,470	82	10	258	350	2,820
	{ Workers ...	...	...	...	...	41	5	...	46	46
	GRAND TOTAL ...	323	238	1,889	2,470	123	15	253	396	2,866

N. B.—(1) Black-ink figures are carried forward to Field Account Form No. IV.

(2) Red-ink figures are carried forward to Kitchen Account Form No. III.

Hospital Assistant.

APPENDIX XVIII.

KITCHEN ACCOUNTS FORM NO. I.

KITCHEN ATTENDANCE REGISTER.

For the week ending Saturday, the 16th December.

Date.			CLASS (a).				CLASS (b).				Total (a) and (b).		
			Ad- ults.	CHILDREN.			Total.	Ad- ults.	CHILDREN.			Total.	
				12 to 16	8 to 12	Under 8			12 to 16	8 to 12			Under 8
December 10th	...	.	44	4	30	288	346	27	1	1	9	38	384
Do. 11th	...	...	47	4	30	268	349	24	1	1	17	43	392
Do. 12th	...	...	47	4	30	270	351	24	1	2	37	64	415
Do. 13th	...	...	47	5	30	270	352	4	2	1	42	49	401
Do 14th	...	...	46	5	30	271	352	...	...	...	51	51	403
Do 15th	...	...	46	3	30	271	350	...	...	...	51	51	401
Do. 16th	...	...	46	3	30	271	350	3	...	...	51	54	404
Total			323	28	210	1,889	2,450	82	5	5	258	350	2,800

T. NARAINSWAMY,
Hospital Assistant.

KITCHEN ACCOUNTS FORM NO. II.

APPENDIX XIX.

DAILY REGISTER OF RECEIPTS AND ISSUES OF STORES.

Kitchen No. 2 at Relief Work at Katol-Kalmeshwar Road, District—Nagpur.

Date.	Rice.		Flour.		Dhal.		Salt.		Tamarind.		Oil.		Ghee.		Chillies.		Onions.		Vegetables.				Firewood.	
	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	S.	Ch.	Mds.	S.
Balance from last week.	701	8	..	..	20	2	2	..	1	..	2	4	2	8	1	2	..	..	5	..	..	..	56	..
Receipts during the week.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11th ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12th ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13th ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14th ..	800	...	...	...	120	30	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15th ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16th ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total Receipts ..	800	...	...	...	120	..	30	..	...	...	..	..	40	..	4	..	..	..	12	..	..	..	..	..
Total ..	1,501	8	140	2	32	..	1	...	2	4	42	8	5	2	17	56	..

Issues during the week.	December 10th ...	100	4	10	2	2	12
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KITCHEN ACCOUNTS FORM No. III.

STATEMENT OF RELIEF GIVEN IN KITCHENS IN FAMINE RELIEF CAMPS DURING THE WEEK ENDING 16th DECEMBER 1899.

Name of Camp—Charge No. I. *Hospital Assistant in charge*—T. Narainswamy. *Officer-in-charge*—Waman Rao.

1	2			3			4	5			6	
Date.	NUMBER OF DEPENDANTS FED WHO WERE NOT GIVEN A MONEY DOLE—CLASS (a).			NUMBER OF NEW ARRIVALS FED, AND OTHER SPECIAL CASES—CLASS (b).			Grand total of number fed.	DETAIL OF EXPENDITURE INCURRED IN THE KITCHEN.			REMARKS.	
	Adults. <i>202/14</i>	Children over 8.	Children under 8.	Adults. <i>202/14</i>	Children over 8.	Children under 8.		Quantity.	Description.	Rate.		Amount.
Sunday, December 10th	44	34	268	27	2	9	384	Srs. Ch.	Rice	... At 5½ per rupee	Rs. a. p. 135 0 0	The kitchen was opened on the 15th October, and the total expenditure to end of this week is Rs. 1,554.
Monday, do. 11th	47	34	268	24	2	17	392	90 0	Dhal	... " 6½	13 13 6	
Tuesday, do. 12th	47	34	270	24	3	37	415	22 5	Salt	... " 8	2 12 8	
Wednesday, do. 13th	47	35	270	4	3	42	401	22 5	Ghee	... " 1	22 5 0	
Thursday, do. 14th	46	35	271	...	...	51	403	16 4	Vegetables	... " 8	2 0 6
Friday, do. 15th	46	33	271	...	...	51	401	3 4	Chillies	... " 2	1 9 0
Saturday, do. 16th	46	33	271	3	"	51	404	Total food			177 8 8	
								Establishment			3 0 0	
								Miscellaneous: fuel, tin-pots, &c.			14 2 6	
Total	323	238	1,889	82	10	258	2,800	GRAND TOTAL			194 11 2	Cost per unit fed 4¼ pice.

The kitchen was opened on the 15th October, and the total expenditure to end of this week is Rs. 1,554.

Dated KATOL:

The 16th December 1899.

T. NARAINSWAMY,

Hospital Assistant.

WAMAN RAO,

Officer-in-charge.

APPENDIX XXI.

KITCHEN ACCOUNTS FORM No. IV.

Stock Book of Utensils of Kitchen No. 2 on the Relief Work at Katol-Kalmeshwar Road.

No. of articles.	Description of utensils.	Date of receipt in store.	Deduct losses with date of report of loss.	Balance in stores.	Date of verification, with signature.*
<i>Cooking utensils—</i>					
3	Large copper dekhies ...	10-10-99.	...	3	Verified 15-12-99 T. NARAINSWAMY, <i>Hospital Assistant</i>
4	Small " " ...		...	4	
8	Iron ladles " ...		...	8	
<i>Vessels for eating and drinking—</i>					
300	Tin plates (Sunkis) ...	10-10-99.	20	280	
300	Tin mugs ...		15	285	

* The balance in store should be verified weekly by the Hospital Assistant.

Medicines.				A six months' supply,		
				Lbs.	Oz.	Drs.
Tinctura Camphoræ Co.	...	...	...	2	0	0
" Capsici	...	...	...	0	4	0
" Catechu	...	...	...	3	0	0
" Digitalis	...	...	...	0	2	0
" Opii	...	...	...	2	0	0
" Scillæ	...	...	...	1	0	0
" Ferri Perchloridi	...	...	...	1	0	0
" Iodi	...	...	...	1	0	0
Vinum Ipecacuanhæ	...	...	...	2	0	0
Zinci Oxidum	...	...	...	0	8	0
" Sulphas	...	...	...	0	8	0
Phenyle—Little's Soluble	...	...	...	1	Gallon.	
Disinfecting Powder, MacDougall's, in Casks of 112 lbs.	...	...	...	1	Cask.	

Surgical Instruments, Medical and Surgical Appliances and Sundries.				Quantity.		
Catheters, Elastic Gum	...	...	...	1	set.	
Lancet, vaccinating	...	...	...	No.	1.	
Pocket dressing case, Kemp's No. 2 at Rs. 44	...	...	...	"	1.	
Ligature, silk	...	...	...	Drs.	2:	
" silver wire	...	...	...	"	2.	
Stethoscope, cedarwood	...	...	...	No.	1.	
Splints, arm, hollowed wood, Potts	...	...	...	1	set of eight.	
Syringe, Enema, Higginson's with Vaginal tubes	...	...	...	No.	1.	
" Ear, brass, 4 oz. size	...	...	...	"	1.	
" Glass, 2 oz. size	...	...	...	"	6.	
Thermometer, clinical, self-registering	...	...	...	"	1.	
Basin for washing hands, enamelled iron, medium size	...	...	...	"	1.	
" dressing, enamelled iron, kidney shape	...	...	...	"	1.	
Bottle N. M., stoppered, 50 oz. size	...	...	...	"	6.	
Bandages, calico, roller, each 2½" x 36"	...	...	...	"	12.	
Corks, quart	...	...	...	"	24.	
Corkscrew	...	...	...	"	1.	
Cup, Feeding, China	...	...	...	"	1.	
Funnel, enamelled iron, 8 oz. size	...	...	...	"	1.	
Gallipots of sizes	...	...	...	"	24.	
Lint	...	...	...	1	lb.	
Measure glass 4 oz.	...	...	...	No.	2.	
" " 2 oz.	...	...	...	"	2.	
" " minim	...	...	...	"	2.	
" pewter double ½ oz. and 1 oz.	...	...	...	No.	1 each.	
Paper, Filtering	...	...	...	4	sheets.	
Pestle and mortar, wedgewood, medium size	...	...	...	No.	1.	
Phials, common, English, 8 oz. size	...	...	...	"	12.	
" stoppered N. M., 4 oz. size	...	...	...	"	6.	
Pot, decoction, tin	...	...	...	"	1.	
" infusion, tin	...	...	...	"	1.	
Scales and weights, grains and drachms	...	...	...	1	set.	
Scissors, shop	...	...	...	No.	1.	
Slab, wedgewood, 12" x 12"	...	...	...	"	1.	
Spatula bolas	...	...	...	"	2.	
Sponges	...	...	...	1	oz.	
Tow, carbolic	...	...	...	2	lbs.	
Condensed milk, Anglo-Swiss, Milkmaid Brand	...	...	...	12	tins.	
Rum	...	...	...	3	bottles.	

All the above can be procured from Kemp & Co., Bombay, ready packed for about Rs. 312.

Hospital Extras and Accessories permissible under Articles 109 and 110 of the General Order above quoted.

Names of Articles.			Quantity.
*Milk, fresh	} As required.
Sago	...	...
Arrowroot	...	...
Suji	...	...
Sugar	...	...
Salt	...	...
Ghi, or tilli-oil	...	...
Vegetables	...	...
Condiments, consisting of chillies, turmeric, garlic and coriander.			
Amchur, or tamarind	...	...
Lime-juice	...	...
Meat (when available)...	...	...
Feeding bottles for infants	No. 4.
Spoons for feeding those who are unable to feed themselves...			No. 6.

* Condensed milk to be used when fresh milk is not procurable.

APPENDIX XXIII-A.

MEDICAL INSTRUCTIONS.

P. W. D. Famine Works, Central Provinces.

The following orders are issued by authority for the guidance of all Hospital Assistants. A copy is to be hung up in every Relief Camp Hospital.

DUTIES OF MEDICAL SUBORDINATES IN CHARGE OF FIELD HOSPITALS UNDER THE P. W. D.

1. The Hospital Assistant shall daily attend with the Officer-in-charge when the gangs are being formed, or when any new-comers arrive at the camp, and inspect their physical condition.

2. Any applicants in such a condition of weakness or emaciation as to render them unfit for work are to be fed either in the Kitchen or the Hospital, according to their condition.

3. No applicant for work or food in an emaciated condition should under any circumstances be refused relief and allowed to wander about until his condition becomes dangerous. A few good meals to a hungry man will enable him to recover his strength quickly and support himself, whereas if the people are allowed to become emaciated they are unable to digest ordinary food and it takes much time and considerable expense to get them into working condition again.

4. The Hospital diet for an emaciated patient should ordinarily consist of—

Sago	...	...	... 2 Chattaks.
Sugar	...	...	... 2 Chattaks.
Milk	...	...	... 1 Seer.

If considered necessary this may be supplemented by giving an extra quantity of milk, and a small quantity of *Tilli* oil ($\frac{1}{2}$ chattak) may be given to the patient for rubbing into his skin.

5. When the patient is able to digest more food, the rice and dhal ration may be issued to him cautiously. Some onions should be mixed with the dhal and oil added to it while it is cooking. Mung dhal should be used and very carefully cooked.

6. In some cases of extreme weakness strong mutton or chicken broth should be issued very carefully cooked, or raw meat juice may be given in suitable cases.

7. On no account are patients in a state of emaciation or who have been unable to obtain food for some time to be given an ordinary ration: it cannot be digested and will very probably produce diarrhoea and dysentery.

8. Country spirit should be given in small quantities where there is extreme exhaustion.

9. Food to starving patients should always be given comfortably hot and in small quantities very frequently, about every $\frac{1}{4}$ of an hour at first, and the intervals should be gradually increased as the patient revives. The amount must be regulated by the condition of the patient.

10. For this purpose a considerable number of attendants must be allotted to the Hospital, and the Hospital Assistant should carefully select from amongst the people on the works attendants of various castes to attend to the sick: one relative may be allowed to attend a sick person.

11. These attendants should be paid something additional, either in food or wages over and above the maximum wage so as to ensure their taking an interest in the work and prevent them from taking the patient's food when they are not relatives.

12. A fire should always be kept going night and day, so that hot food may be made up and given at all hours comfortably warm.

13. A supply of the following extras should be kept in the Hospital for the immediate preparation of easily-digested nourishing food (in case other supplies are not ready) as they can be used immediately :—

Horlick's malted milk	...	3 large bottles.
Condensed milk (Milkmaid brand)	...	6 tins.
Country spirit	...	1 bottle.

14. Either of these foods mixed with some hot water will provide nourishing food and a few drops of country spirit may be added if required.

15. The Hospital Assistant should always attend the Kitchen when the food is being given out to see that it is properly cooked, of good quality, and the grain properly cleaned and issued according to scale.

16. If the dhal and rice husk is not properly cleaned away it is very irritating to the intestines.

17. The Hospital Assistant should submit his indent to the Officer-in-charge for articles of diet required in the Hospital, and for this purpose a counterfoil book will be convenient ; but failing this he should keep a copy of his indents.

18. Every patient's name and disease must be entered on his bed-head ticket, together with the medicine given and the diet ordered.

19. This must be copied into a book so that the issue of extra diet can be carefully checked.

20. The Officer-in-charge should be directed by frequent inspections to see that the patients are actually getting the diets indented for.

21. The Officer-in-charge must comply with the Hospital Assistant's indents, but if he considers they are not being used legitimately he should make an immediate urgent report to the Executive Engineer for orders.

INSTRUCTIONS TO HOSPITAL ASSISTANTS.

22. The Hospital Assistant should frequently walk round the camp in the morning and evening and see that the people do not ease themselves inside the boundary flags; and if any are caught doing so they should at once be brought before the Officer-in-charge for some punishment. The Hospital Assistant should also see that the guards are alert and attending to their duties regarding sanitation.

23. He should also frequently visit the camp water-supply, and see that it is protected from contamination, and that only the appointed Raots draw water from the wells.

24. On the outbreak of any epidemic, he should at once make a special report to the Civil Surgeon through the Officer-in-charge.

25. If cholera breaks out, the well should be purified with permanganate of potash in the manner laid down, and the camp moved if the outbreak is severe.

26. He should frequently inspect the food-grains being sold to see that they are of fair quality.

27. He must see to the careful cooking of the food issued in Kitchens, and that it is issued in proper quantity at the feeding time.

28. All Hospital Assistants should understand distinctly that they are the responsible advisers of the Officer-in-charge regarding sanitary matters; and the health of the camps will depend very largely on the ability and energy they display in looking after the sanitary matters generally.

29. The Officer-in-charge should give every assistance to the Hospital Assistant and at once carry out any reasonable suggestions for the improvement of sanitation. It is no use Hospital Assistants bringing sanitary defects to notice if steps are not taken at once to improve matters.

30. Until proper forms are sent round the Hospital Assistants should keep a careful list of all patients treated either as out-patients or in-patients.

31. The following procedure will be adopted as regards supplies of medical stores, drugs, and hospital comforts:—

- i. Original sets of medicines with instruments, &c., will be supplied on opening a charge.
- ii. These sets will be replenished as necessary by indent on the Civil Surgeon, who will transfer it, amended, if necessary, to the Executive Engineer for supply to be made.
- iii. When a drug or medical store is expended to the extent of one-half the authorized scale, a quantity equal to that authorized in a new set of medicines will be indented for. It should not be forgotten that quite a fortnight to three weeks will be occupied in obtaining the new supply, except in regard to permanganate of potash and a few other items which will be held in bulk at district head-quarters.
- iv. The Officers-in-charge should arrange for supplies of milk, sago and sugar for the diet of emaciated persons, also for keeping in hand some country spirit, obtaining the latter through one of the licensed vendors or the Sub-Divisional Officer.
- v. The Executive Engineer will hold a stock of Horlick's malted milk and issue the same to Hospitals as required on indent.
- vi. Tili oil will be supplied from the local jails as required, on fortnightly indents, for use in cooking in the Kitchens and Hospitals. The local bazar-purchased tili oil is not to be used unless unavoidable.
- vii. The extra foods required in dieting patients should be kept in store in such quantities as may be deemed advisable, and be issued on the daily indent of the Hospital Assistant or medical subordinate in charge.

32-33. The authorized forms for use in each Hospital are—

Statement No. I.—Showing the number of patients received in special Famine Hospitals attached to Relief Work camps and the number of deaths which occurred in camp.

Statement No. I-A.—Showing diseases of in-door and out-door patients treated in hospitals attached to Famine Relief camps.

Statement I-B.—Showing the diseases from which deaths occurred in Famine Relief camps.

Out-door Tickets, Bed-head Tickets, Daily Register of out-patients, Daily Register of dieting out-patients, Diary of out-patients, Abstract of Daily Register of out and house patients in the Dispensary during the month.

33-34. The following matters should receive the special attention of Officers-in-charge and medical subordinates at every Charge.

34-35. *Water-Supply*.—In every camp the distributing arrangements for water-supply should be carefully seen to. Some of the lower castes, such as Chamars, will only drink from men of their own caste, and where this is the case another water bearer of this caste should be appointed in addition to the usual Raot.

35-36. No hard-and-fast rule can be made as regards the numbers of pias; they must be provided as required, and sufficient ghurras should be provided at each piao to enable enough water to be stored when the water-supply is far distant. At each camp 2 or 3 large pias should be established.

36-37. The number of water carts required at each camp should be carefully settled by the Famine Works Superintendent and Sub-Divisional Officer.

37-38. *Latrines*.—The dry earth for latrines requires to be collected and stored in large quantities and finely powdered under cover. Latrine trenches and graves may be dug by the workers so as to be ready for emergencies.

38-39. All cases of cholera are to be reported daily by the Officer-in-charge direct to the Civil Surgeon of the District, copies being posted to Executive Engineer and Sub-Divisional Officer at the same time. All deaths should be reported at once to the nearest police post.

39-40. All cases of a serious and chronic nature or of severe injury must be removed to the nearest dispensary if such removal is not considered dangerous to the patient, and cases which can be better treated at a permanent dispensary are not to be kept in the field hospital.

41. The lesser qualified members of the medical staff are to be put in charge of hospitals in camps which are not far from (a) permanent dispensaries, (b) field hospitals in charge of a duly-qualified Hospital Assistant. Cases requiring treatment by a duly-qualified Medical Officer can then be easily removed to the permanent dispensary or to the field hospital with a Hospital Assistant in charge as the case may be. The lesser qualified man in charge of the lesser important field hospital need not have more medicines or appliances than are necessary for the simple classes of cases.

42. It must be understood that in all matters connected with their professional work Hospital Assistants shall correspond direct with the Civil Surgeon, taking their orders from him. As regards Hospital extras and necessaries which can be supplied on the spot, they are to be issued freely as required by indent on the Officer-in-charge.

43. The Hospital Assistant is wholly responsible for the management of the hospital. His responsibilities as regards the water-supply, conservancy, the hospital and kitchen are set forth in para. 108 of G. O. No. 287/7630, dated the 9th September 1899.

44. Hospital Assistants are held responsible for the punctual submission on the 3rd of each month to the Civil Surgeons concerned of the monthly statement showing the diseases of the In-door and Out-door patients who were admitted into Famine Relief Hospitals or treated in camp during the month

It is not considered necessary to destroy tents or furniture which have been used by small-pox patients, and the following procedure will be sufficient:—

- (a) *Tents*.—To be thoroughly sprayed with 1 in 1,000 solution of Corrosive Sublimate, and left standing (the kanats having been taken down) for 10 days.
- (b) *Furniture*.—To be sprayed with the same solution, and afterwards washed with country soap and water, and then left exposed to light and air for 3 days.

The following mixture gives the required solution:—

Corrosive Sublimate..	...	½ ounce.
Hydrochloric acid ...	...	1 „
Water	...	3 gallons.

Measures to be adopted on the occurrence of Cholera in Famine Relief Camps.

1. The sick to be sent at once to hospital.
2. The infected gang to be assembled on their original site, and all the water in their possession to be so thrown away that it may not interfere subsequently with the disinfection of the ground. All gurras to be broken, and old baskets and dirty useless rags burnt. Cooked food and gur should also be burnt.
3. The gang is then to be marched to the disinfecting station, where their persons and clothes will be disinfected with potash permanganate. The metal cooking vessels will there be disinfected by heating over a large fire. "Kansa" vessels can be disinfected by heating over a large fire.

APPENDIX XXIV.

FAMINE RELIEF WORKS, CENTRAL PROVINCES.

Carriage of Metal and Moorum from Quarries to Roadside by Relief Workers.

Suppose moorum or metal collected in large quantities at a quarry a quarter of a mile from the roadside, and that it is desired to carry this to the roadside by the agency of relief workers.

	2. Taking a full strength gang consisting of—
	20 Class I, or diggers.
Gangs at quarry.	52 „ II, carriers.
	16 „ III, working children or $\frac{1}{2}$ carrier units.
Total	... 88

The gang might be employed as follows:—The 20 diggers in filling the metal or moorum into baskets with phowras, and as this is comparatively much easier work than digging earthwork with picks, the task should be fixed at 100 cubic feet per digger or 2,000 cubic feet in all for the gang. Ten of the class II or adult carriers should be employed behind the diggers in lifting the baskets from the ground to the carriers' heads; leaving 42 class II and 16 class III (equivalent to 50 carrier units) to carry the material away. There is no question of lift in their case, and the distance they should travel is found from the table of standard tasks (Appendix IV), *viz.*:—

$$\begin{aligned}\text{Lead} &= \frac{\text{Number of carriers} \times 10,000}{\text{Task for diggers}} \\ &= \frac{50 \times 10,000}{2,000} \\ &= 200 \text{ feet.}\end{aligned}$$

The carriers of the first or quarry gang will therefore carry the material to a distance of 200 feet from the quarry and deposit their baskets on trestle platforms at the level of their heads (see sketch).

3. From thence the baskets are carried on by the members of the next gang to another platform distant 400 feet from the first, where they in their turn deposit the baskets, returning with empty ones, which they find there, to No. 1 platform, where they exchange the empty baskets for full ones and deliver these at No. 2 platform, and so on. Another gang carries the full baskets from No. 2 to No. 3 platform, returning with empties, and the same thing goes on till the road is reached. Each gang working over a distance of 400 feet, except the carriers of the first or quarry gang, who work over a length of 200 feet only.

4. All the workers in the gangs, other than the quarry gang, will necessarily be employed in carrying, and if there are any class I workers in the gang, these should carry or do a task 50 per cent. in excess of the ordinary of class II task, children of class III doing one-half of the class II task.

The distance or lead being 400 feet, the task for a class II unit will be $\frac{10,000}{400} = 25$ cubic feet, and that for class I, $37\frac{1}{2}$ cubic feet, and class III $12\frac{1}{2}$ cubic feet. The strongest gangs should always be placed at the quarry, and the weaker ones on the line of communication. An average gang doing a full task in carrying over a distance of 400 feet, would consist of and be able to carry—

		Cubic feet.
18	Class I @ $37\frac{1}{2}$ cubic feet =	675
48	„ II @ 25 „ =	1,200
14	„ III @ $12\frac{1}{2}$ „ =	175
Total	... 80	2,050

or a little more than the quarry gang can supply them with.

5. The last gang on the line will empty its baskets at the end of the continuous heap of metal or moorum, where a few class I workers will dress it to the proper templet. If the moorum is for repairs to an already surfaced road it will be stacked off the road surface, and metal will, in all cases, be so stacked. In the case of moorum for soling or surfacing a new road bank, the moorum will be stacked in a continuous stack down the centre of the road, to a templet of 9 square feet, see sketch.

6. The task for all gangs including the quarry gang will be set out and measured on the road stack in exactly the same way as described under metal breaking (Appendix VIII). In the present instance, supposing only one string of gangs to be employed, the task is moving 2,000 cubic feet from the quarry to the roadside and stacking it there. The moorum stack on the road has a capacity of 9 cubic feet to the foot run, and the length of stack that represents the task is therefore $\frac{2,000}{9} = 222\frac{1}{3}$ feet. This length is set out by the Work Agent, and if completed all the gangs get full wages. If it is not done and there is no accumulation of baskets on the line of communication to make up the deficiency, then all the gangs including the quarry gang should be fined. If an accumulation of baskets (which may be reckoned at $\frac{1}{3}$ cubic foot each) is found on the line, and these with the quantity delivered at the roadside make up the full task, then the gangs from the quarry onwards up to the point where the block occurs have done their work and should not be fined, but only those gangs that are responsible for the block on the line.

7. A sketch of a bullic platform to facilitate the transfer of full baskets from one gang to another is attached.

NOTE.—Also see Central Provinces Circular letter No. 4-1314—F, dated the 5th February 1900, attached.

Circular letter No. 4-F-1314, dated Nagpur, the 5th February 1900.

From—The Hon'ble L. M. Sr. CLAIR, A. M. INST. C. E., Officiating Secretary to the Chief Commissioner, Central Provinces, Public Works Department,

To—All Executive Engineers of Divisions, Central Provinces.

Famine Relief-works—Carriage of metal and moorum from quarries to roadside.

I am directed by the Officiating Chief Commissioner to invite your attention to Appendix XXIV of General Order No. 287-7630-F., dated the 20th September last. This appendix deals with the carriage of metal and moorum from quarries to the roadside by famine relief-workers.

2. Considerable difficulties have been experienced in working out the instructions contained in that appendix; and there is no doubt that the system requires great care and attention on the part of responsible officers, and especially on the part of Famine Works Superintendents and Sub-Divisional Officers. So great have been the difficulties experienced that some officers have proposed to give up the system altogether. Mr. Fraser does not, however, regard these difficulties as insuperable; and he cannot consent to the abandonment of the system.

3. Mr. Fraser values this system as being conducive to order and discipline on the works. This appears to him a consideration of supreme importance. In the course of his inspections, he has found instances in which works have been carefully organized from the first. The Executive Engineer or Sub-Divisional Officer has set himself, despite the stress of other calls on his attention, carefully and determinedly to put everything in order from the first. He has seen personally to the organization of the gangs, and has fixed the tasks after carefully ascertaining by personal inspection what the gangs are able to do as a full day's work. The result has been an orderly camp, where the task imposed has been as effective a test as could be devised. On the other hand, Mr. Fraser has found instances in which there has been carelessness or haste in the initial organization, with precisely opposite results. Tasks have not been properly fixed. Discipline has been absent. Money has been wasted. And people have been attracted to the works who should not be on them. The importance of discipline and careful organization cannot be overrated.

4. Experience seems clearly to show that, in carrying metal or moorum by relays of workers, the following rules must be observed:—

- (1) The diggers or fillers, as the case may be, must be entirely separated from the carriers, and must form a small gang by themselves at the quarry end of the lead.
- (2) The stackers must also be separated and set to work by themselves at the road-side end of the lead.
- (3) The lengths over which the successive gangs work must be equal throughout from the quarry to the road-side.
- (4) All who are engaged in carrying must be classed as carriers (whether men or women) of Class II or as working children of Class III, as the case may be.
- (5) The number of carriers in each gang must be the same throughout; and similarly the number of working children must also be the same throughout.
- (6) There must be two sets of baskets at the quarry, each set of the same number as the number of the carrying gang; and each gang throughout the lead should also have a double set of baskets.
- (7) One or more special gangs must be employed in breaking metal or in digging moorum; and carriers or working children must be taken from these to fill the places of absentees in the carrying gangs. The strength of the latter will thus remain unchanged, all absentees being entered against the special gang from which the temporary substitutes are taken.
- (8) Each carrying gang must march in a compact body accompanied by the mate, who shall be responsible for the pace.
- (9) The set of gangs (up to a maximum ordinarily of about eight gangs) employed in connection with the carrying at one point should be under the charge of one Gang Muharrir, who shall be responsible that no block occurs through the laziness of any particular gang.

5. A few remarks may be made in explanation and elucidation of these rules. Firstly, in regard to Rules (1) and (2), the strength of the digger, filler or stacker gangs must be

carefully fixed in reference to the task fixed for the carrying gangs. On one work, for example, Mr. Fraser found ten workers of Class I and ten workers of Class II set apart for "filling and lifting" at the quarry moorum stacks. By standing and watching the work he saw that only 3 or 4 men were adequately employed in filling, and that the carriers themselves lifted their own baskets here as well as at the other stages of the lead. The Sub-Divisional Officer was directed to take up the matter and he found that four "diggers" were enough. Similarly, by careful watching he reduced a gang of 9 men of Class I and 10 of Class II to 2 men of Class I to do the stacking at the other end of the lead. For the "stacking" was practically only dressing the moorum thrown on the heap by the last gang of carriers.

6. The third, fourth and fifth rules are essential because the number of *baskets* must be the same throughout. Otherwise a certain number of one gang has to wait until the gang with the smaller number can go back and bring the surplus required. Delays thus take place; and gangs are also broken up to the prejudice of discipline. The sixth rule is also necessary to prevent delays which when they occur at any point are of course accentuated throughout the lead. For obvious reasons the seventh rule is required to maintain the equal strength of all gangs from day to day.

7. Rules (8) and (9) are intended to enforce persistent discipline throughout the working hours of the day. The responsibility of Mates and of Gang Muharrirs must be rigorously enforced. A mate must take in all cases his full share in the fine imposed on the gang, and should also lose the extra pice paid to him under the rules when he has failed to earn it by exacting proper work from the gang. In the same way Gang Muharrirs should be fined when they fail to discharge their responsibility.

8. It may perhaps be well to point out that the limit of "30 able-bodied workers" fixed for gangs under the Intermediate System in paragraph 25 of the General Order, paragraph 5 of Appendix V, and the "Instructions for filling in" prefixed to Appendix XI-a, does not apply to carrying gangs. It is often found expedient to have the gangs of quite double that strength; and this is contemplated in paragraph 2 of Appendix XXIV. It was for gangs of about 80 each (including "working children") that four fillers and two stackers were found sufficient (*vide* paragraph 5 above).

9. One other point of importance remains for consideration, that is, the fixing of the carriers' task. It seems to be the common opinion that tasks set forth in Appendix XXIV and the other Appendices to the General Order are fixed without the possibility of modification. Paragraph 49 of the General Order has been overlooked. These tasks are given as illustrations merely. The responsibility of making the task on any kind of work a full task for the workers employed rests on the Executive Engineer and his responsible subordinates. On one work when it was discovered that the men of Class I who were employed as carriers only carried the same as the workers of Class II, the former were very properly included in the latter class and paid accordingly. This was right, and is what is intended by Rule (4) now issued. But the Sub-Divisional Officer went on to reduce the task prescribed for the gang. This was quite wrong. Experience had shown that the gang could easily perform the old task; and that should have been maintained. Full tasks, as shown by the experience of what carefully watched gangs can perform, must be fixed and exacted.

10. A small matter remains. The Officiating Chief Commissioner finds that the "platform" prescribed by Appendix XXIV is rarely used. On most works the trestles provided are utilized only for swinging the improvised hammocks of the babies. They are not necessary for the carrying work. It is sufficient that the baskets be passed from head to head, or laid down in an orderly manner on the ground to be lifted. In the latter case, the people help each other. And there seems a universal objection to the use of the "platform."

11. The Officiating Chief Commissioner trusts that these instructions will lead to the successful application of this system of carrying, which he desires to see adopted in the interests of discipline. He is convinced by careful observation that it is practicable except where the numbers on the works are exceptionally fluctuating owing to altogether abnormal conditions. He trusts also that Executive Engineers and their subordinates will bear in mind the absolute necessity of careful organization and strict discipline from the very first in all classes of work.

CIRCULAR N^o. F-10.

CENTRAL PROVINCES, PUBLIC WORKS DEPARTMENT.

[Secretariat.]

FROM

G. J. PERRAM, Esq, M. INST. C. E.,

SECRETARY TO THE CHIEF COMMISSIONER,

Central Provinces,

Public Works Department,

TO

ALL EXECUTIVE ENGINEERS OF DIVISIONS,

Central Provinces.

Nagpur, the 7th April 1900.

Carriage of Mooram from quarry to road-side.

SIR,

To obviate misconception in regard to this Administration's Circular letter No. 4-F—1314, dated the 5th February last, I am directed to say that the Officiating Chief Commissioner is prepared to sanction the method of direct carrying from the quarry to the road-side, where it is found inconvenient to introduce the method of carrying by relays, *vide* paragraph 11 of that Circular letter.

2. Where the former system is introduced it is necessary to arrange for the maintenance of strict discipline. It was the main object of the orders contained in that Circular letter to maintain discipline; and it is essential that this should not be lost sight of.

3. It must be borne in mind that where men and women work together as carriers both must belong to Class II [paragraph 4 (4) of the Circular letter referred to].

4. The direct system of carrying must not in any case be adopted for unduly long leads, say, of over a mile; for the continued strain is too great. And even when men work alone, it is better to give them a reasonable burden to carry (as members of Class II) than to pay them more for carrying too heavy a burden. Only really strong men should be included in Class I, and then only when working in a separate gang.

5. Discretion as to the system to be adopted is thus left with you. What is required is that you should exercise that discretion after giving full consideration to all the facts and circumstances of the case, and especially to the necessity for enforcing strict discipline.

I have the honour to be,

Sir,

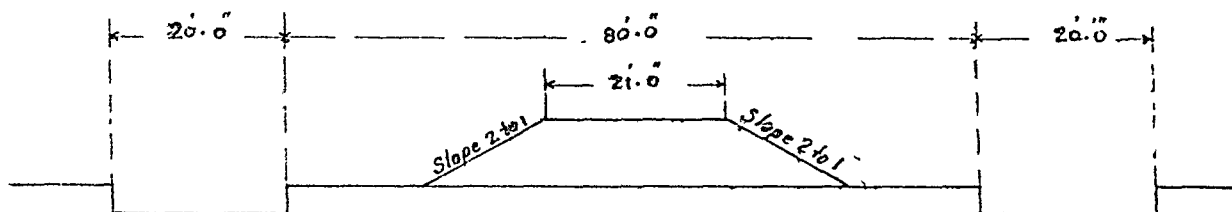
Your most obedient Servant,

G. J. PERRAM,

Secretary.

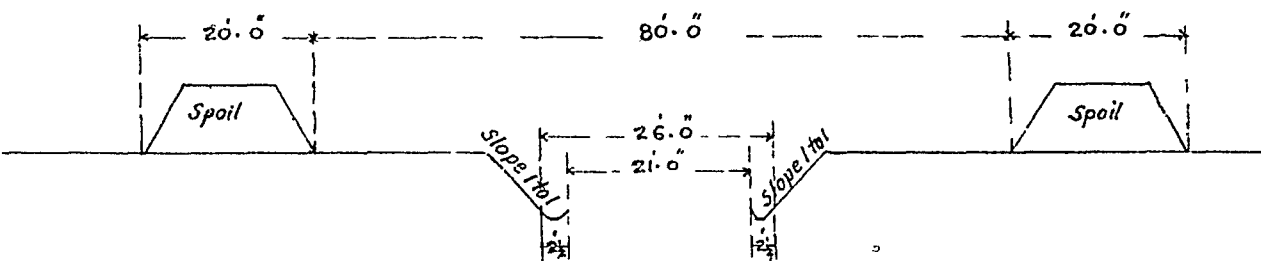
TYPE CROSS SECTION OF ROAD IN EMBANKMENT

Scale $20\text{ Ft} = 1\text{ Inch}$



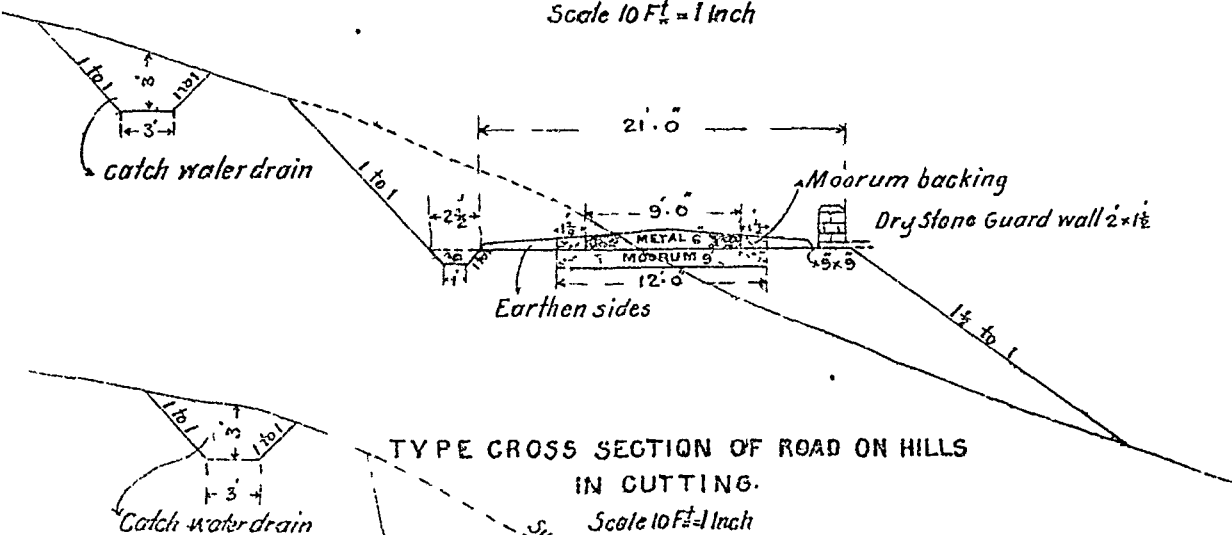
TYPE CROSS SECTION OF ROAD IN CUTTING.

Scale $20\text{ Ft} = 1\text{ Inch}$



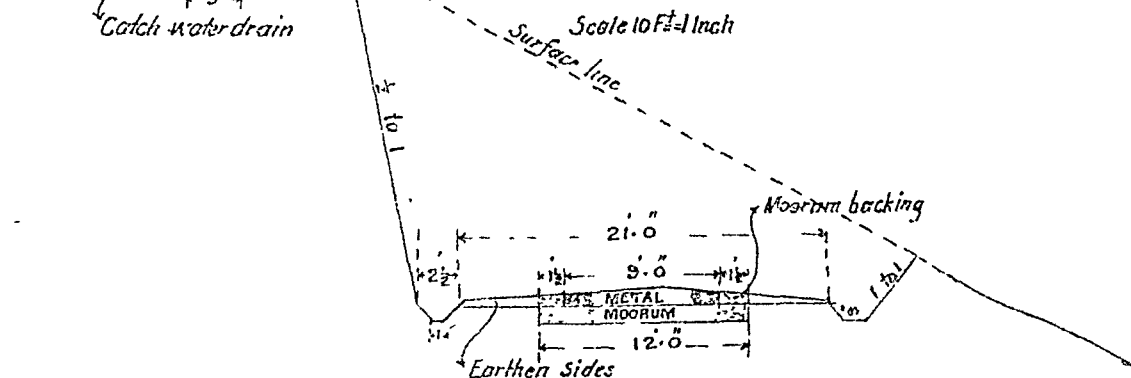
TYPE CROSS SECTION OF ROAD ON HILLS IN $\frac{1}{2}$ CUTTING AND $\frac{1}{2}$ BANK.

Scale $10\text{ Ft} = 1\text{ Inch}$

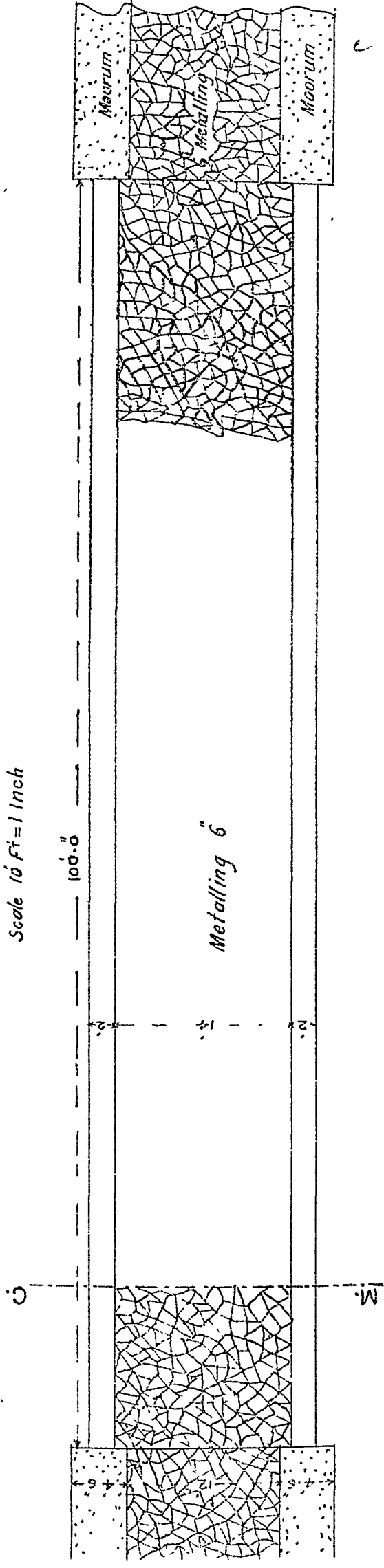


TYPE CROSS SECTION OF ROAD ON HILLS IN CUTTING.

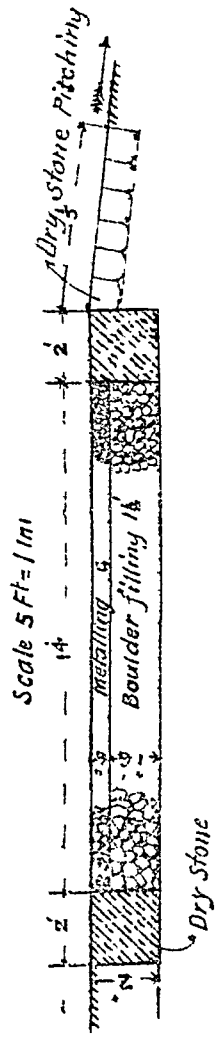
Scale $10\text{ Ft} = 1\text{ Inch}$



TYPE DRAWING FOR METALLED CAUSEWAY



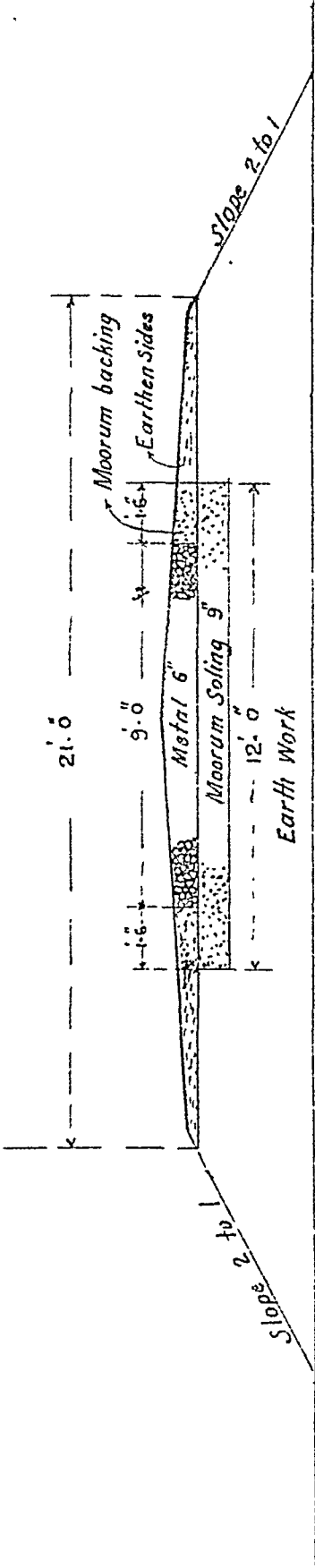
SECTION ON M.C.



Note
Top of causeway should be flush with
and never higher than the bed of the river

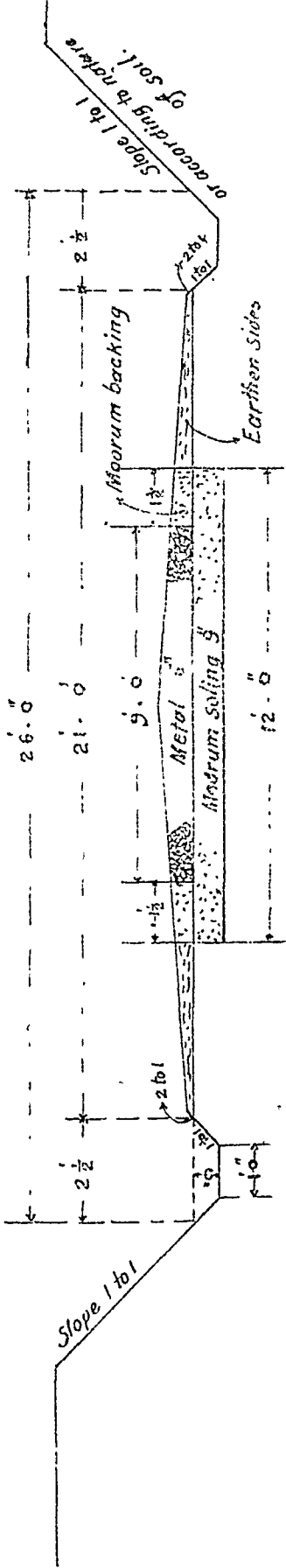
DETAILED TYPE CROSS SECTION OF ROAD IN EMBANKMENT

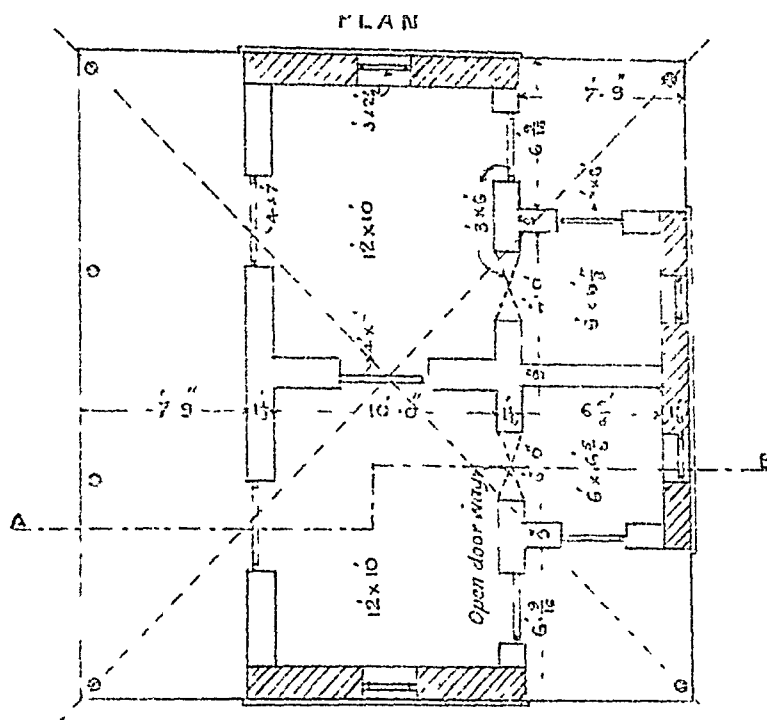
Scale 4 Ft = 1 Inch.



DETAILED TYPE CROSS SECTION OF ROAD IN CUTTING

Scale 4 Ft = 1 Inch

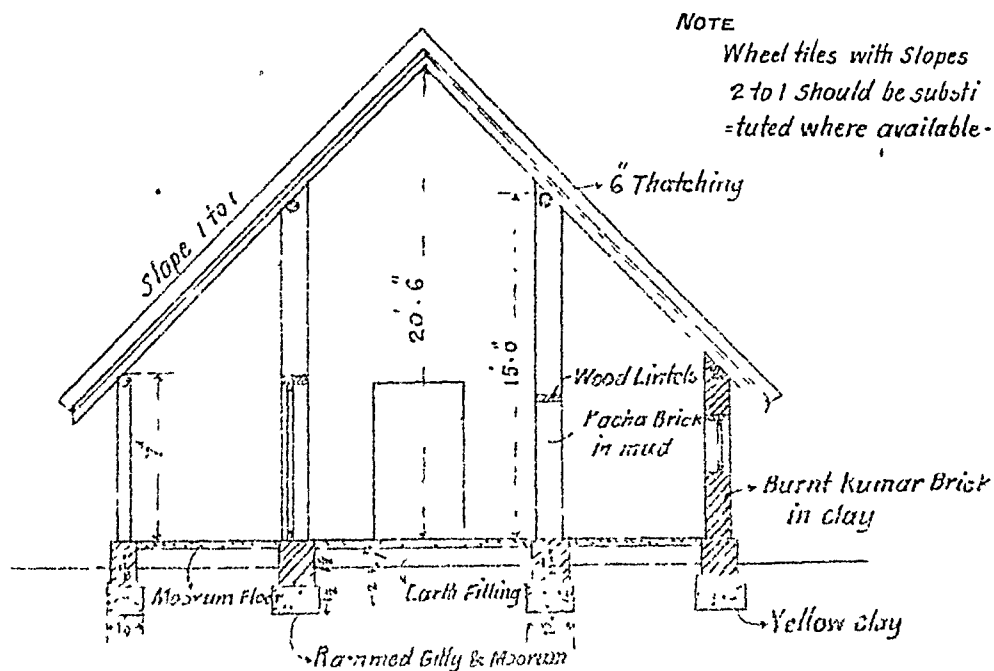




Note

Plinth area 760 S.Ft. Estimated Cost of the Building with 2 ft foundation is Rs. 363/- or $\frac{363}{760} = \text{Rs. } 0.7-8 \text{ S.Ft.}$

SECTION ON A.B.



NOTE

Where Brick Masonry is not procurable wattle and daub walls to be substituted.

N.B. The cost with single wheel tiles should be Rs. 397/-